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ment Steel Plants—p. 115
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The IRON AGE

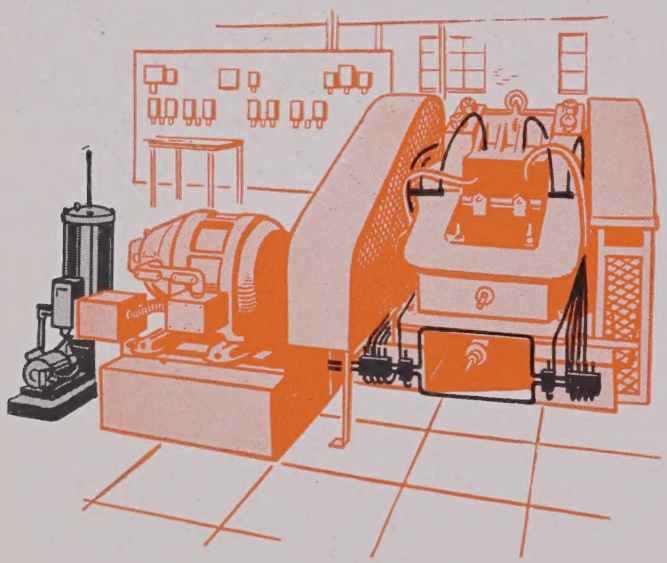
FEBRUARY 10, 1949

INLAND

TEEL of unvarying
quality made
to your
specifications

NLAND STEEL COMPANY • CHICAGO

Stops bearing trouble on six rock crushers by installing Farval



FREQUENT bearing failures interfered seriously with production in an ore preparation plant. The material processed was an extremely hard flint-like rock, which not only generated tremendous bearing pressures in the crushers, but created a highly abrasive dust as well. Various methods of lubrication were tried, including drip systems, wick feeds, grease cups, and automatic oil cups. Many of these devices plugged up with dirt. Dust got into bearings and quickly ruined them, resulting in continual shutdowns for bearing replacement.

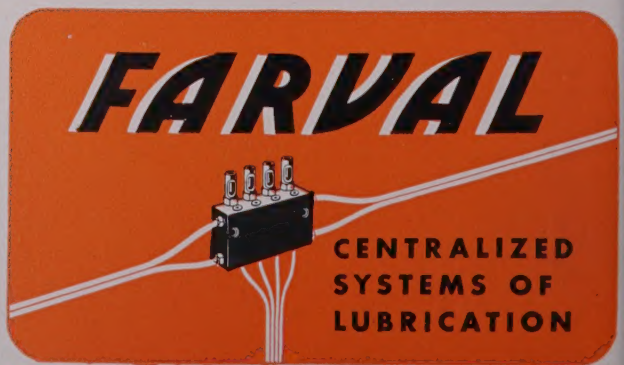
Finally, a Farval centralized lubrication system was installed on one crusher. It stopped the trouble. It was so successful that Farval systems were installed on the five other crushers. Now the swing jaw, Pitman and main eccentric shaft bearings on each crusher all receive adequate, automatic lubrication. There have been no bearing failures since Farval was installed.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, as often as desired. It does its work while the machine is in operation. Farval—the Dualine System with the Positive Piston Displacement Valve—that has but 2 Moving Parts—is Fully Adjustable—and with a Tell-tale indicator at each bearing to show the job is done.

Write for Bulletin 25 for a full description of Farval. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

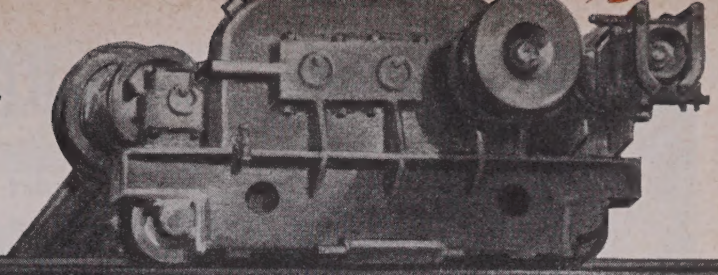
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication No. 104*

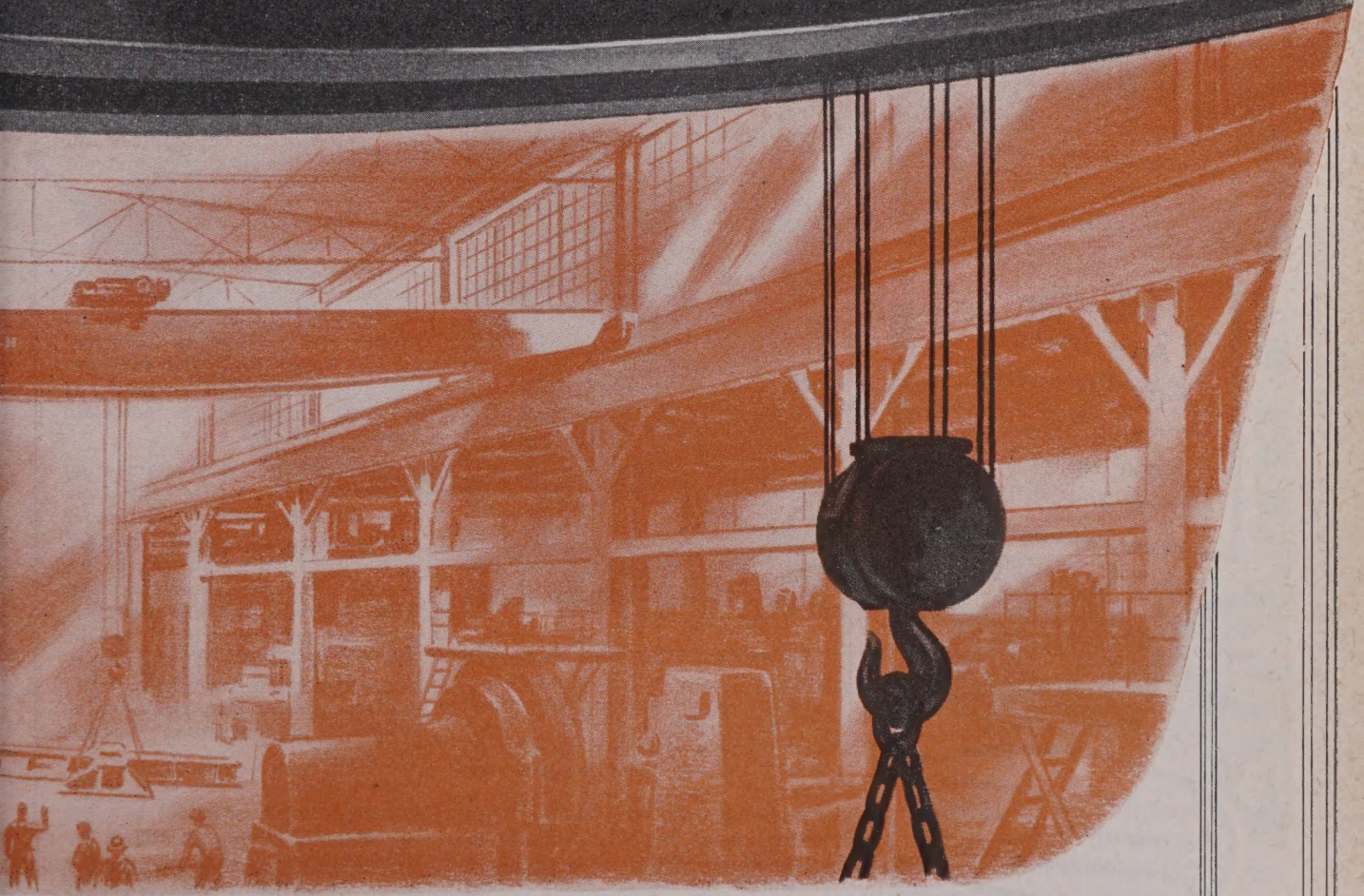


THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $25 per year. Single Copies 35c. Annual Review Number, $2.00 Vol. 163, No. 6.

NEW ANSWER
to an old problem!



P&H



The P&H Magnetorque AC Crane Control

Another old bugaboo in crane service has passed out! You no longer need DC cranes in those locations where the finest degree of control is desired.

P&H engineers have found a better way. The new P&H Magnetorque Control, accomplished through electro-magnetic forces, provides the smoothest, most accurate control ever put on overhead cranes. And it is done with the convenience and lower cost of AC power.

This newest P&H Added Value is but one of a long line of developments which have marked P&H's 60 years of leadership in crane building.

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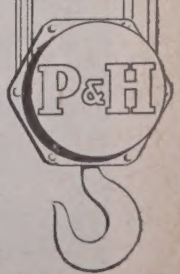

Magnetorque Crane Control is Another P&H Added Value

SPECIAL WASHERS

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12,000 Sets of Tools are at your disposal

More than a quarter-century of experience in designing and making Special Washers

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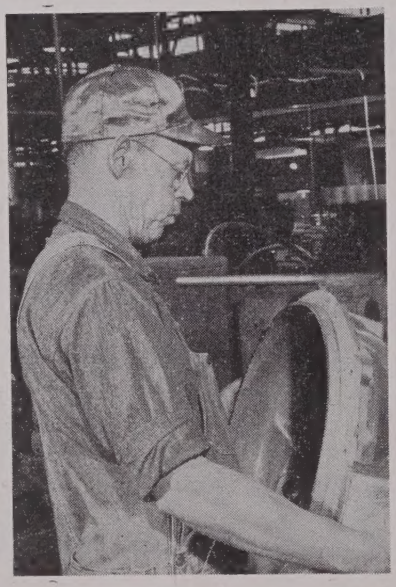
Fatigue Cracks

BY C. T. POST

Taft Labor Act

• • Any day now you can look for your f.f.j. to break into the headlines on the furious tug-of-war over retention of the Taft-Hartley Act. Our Washington underground reports that the Taft forces are laying the January 20 issue as a booby trap for the opposition.

Detonation will occur the first time a repeal advocate attempts to discredit Taft as knowing nothing about labor. The first sucker who says, "Why Bob Taft never worked a day in a factory in his life!" is going to get blown sky high—whammo. Out will come the January 20 issue, and over night Taft will be a union hero.



If you want to get in on the inside just take a look at the illustration for the article "Adjustable Fixture Increases Utility of Special Purpose Machine" (p. 61). In Fig. 2 you might not recognize the operator getting ready to push a button starting the drilling and boring cycle. Fig. 4 shows him unloading a heavy bell housing (imagine the senator easily lifting anything that big!). Fig. 3, shown here, is the dead give-away. Whose thoughtful mug is that, if it isn't our Bob's?

Few readers caught these pictures, which were planted in the Spicer Mfg. Div., Dana Corp., plant at Toledo, right among Taft's own constituents. Most readers were so entranced with the shadow-and-substance drawing of the special fixture, combining elements of three blueprints and costing several hundred bucks to draw, that they overlooked the critical action shots. But one of these days the labor boys are going to be hard put to it to find a shot of Walter Reuther getting *his* hands dirty.

Lustron

• • Whatever you think of Lustron's prefabricated porcelain enamel houses, you have to marvel at the way the company has overcome obstacles. First, they were all ready to set up shop in the Dodge-Chicago plant when Tucker's six exhaust pipes backfired right in their faces and WAA told them to go elsewhere. Finally settled in Columbus, they had to assemble from scratch the biggest assortment of porcelain enameling equipment in the country. Then, when they went out to look for enameling sheets, they found the cupboard bare.

All these difficulties they overcame through sheer persistence. But the biggest problem of all concerned potential customer acceptance. People could be sold on the beauty and utility of porcelain enamel houses, they felt sure, except for one thing. How could you hang a picture on a porcelain enamel wall?

The company's best engineering brains went to work on the problem. First brainstorm was rubber suction cups with hooks attached. These were tried, and for a few months everyone was pretty smug. Then, the cups began to lose their grip, and pictures dropped one by one. We can guess that the promotion department raised the roof: Americans must have their art, be it only an old chromo of "September Morn."

Tom Blair, who has been tracking down more technical but less intriguing aspects at Lustron, reported yesterday that the problem finally is solved. Seems to us he said that Lustron's public relations man confided that some form of rubber adhesive had been found to do the trick.

Our mind at rest on this point, we're going right out to get our Lustron house as soon as we find what kind of a trade-in we can get on our 1895 model Victorian. The plaster is getting pretty crumbly and the dropping pictures keep us awake nights.

131% DIVIDEND

IN ONE YEAR*

The Messinger Mfg. Co., Tatamy, Pa., makers of Insecticide Dusters, Threshers, Corn-Shellers and Woodworking Machinery are reaping the benefits of Turret Lathe Productivity.

131% of the funds invested in Jones & Lamson Turret Lathes were repaid to the purchaser in one year of operation.

* Both large and small lot production of sheaves, bearing caps, blowers, blower cases, worm gear housings, etc., are now turned at peak economy on Jones & Lamson Universal Turret Lathes. One year's savings, based on direct costs alone, more than paid for three machines complete with equipment!

Messinger Mfg. Co., famous for over 90 years' experience in producing agricultural implements, reports that six obsolete lathes were replaced — with capacity to spare. Savings were due to carbide tooling, to the elimination of second operation arbor work (accurate bored jaws were faster and easier) and to the ability of the new machines to hold and repeat exact size settings by means of multiple stops.

Even if your present machines are less than 10 years old, the purchase of a new Jones & Lamson Turret Lathe may be justified through *direct savings alone!* Let us determine YOUR possible savings. **Write to Dept. 710H for this free service.**

Turret Lathe Division

JONES & LAMSON MACHINE COMPANY
Springfield, Vermont, U.S.A.

MACHINE TOOL CRAFTSMEN SINCE 1835

Standard for Industry

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Kester is constantly developing new and better flux-core solders. At present there are over 100,000 types and sizes, each designed to do a certain job in the most efficient manner.

Take advantage of Kester's highly specialized Technical Service. Call in a Kester technical engineer today and let him specify the solder that will enable you to do your soldering faster and better.

Free—Technical Manual

Send for Kester's new 28-page manual, "SOLDER and Soldering Technique" . . . a complete analysis of the application and properties of soft solder alloys and soldering fluxes.

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1899 50th Anniversary 1949

KESTER SOLDER

Dear Editor:

MANUFACTURERS' MARKINGS

Sir:

We have on hand quite a few mill rolls which carry the insignia of several different manufacturers. We are anxious to determine who the manufacturers are and would appreciate it very much if you could help us identify them. The insignia in question are: (1) The letter "L" enclosed in a triangle; (2) the characters "ASE"; (3) "AGF" company; (4) "KU"; and (5) "U" with a small "c" enclosed inside and the letter "Z" following.

E. C. LEONARD
Resident Engineer, Salvage & Reclamation
Reynolds Metals Co.
Louisville

● The companies are: (1) Lewis Foundry & Machine Co., Blaw-Knox Div., Pittsburgh; (2) Aetna Standard Engineering Co., Youngstown; (3) and (4) cannot identify, might be forged rolls made in Germany; and (5) United Engineering & Foundry Co., Pittsburgh.—Ed.

ALUMINUM EXTRUSIONS

Sir:

We are interested in securing the names of firms from whom we could buy aluminum extrusions. We've tried the larger companies, but their delivery is far in the future. If you would know of any firm that can make delivery on new extrusions to our specifications within a reasonable time, we should appreciate hearing from you.

IRVINE KIMMEL
Kimmel Sales, Inc.
Miami, Fla.

● Deliveries are likely to be extended from all sources due to the present shortage, but a list of companies that might be able to help you has been mailed.—Ed.

FINANCIAL ANALYSIS

Sir:

We would greatly appreciate your sending three copies of the steel industry financial analysis chart which appeared in the April 8, 1948 issue. We would also like to have three copies of the article "Armed Services Procurement" from the Jan. 6 issue.

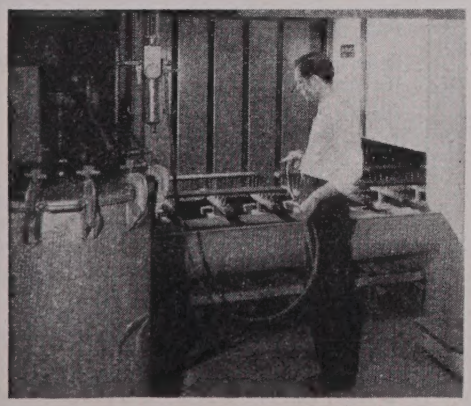
ROBERT B. PARKER
Manager of Sales, Special Accounts Office
Carnegie-Illinois Steel Corp.
Washington

MACHINERY IMPORTERS

Sir:

Will you please send us names and addresses of importers in the New York City area and on the Pacific coast who would be interested in handling and selling in the United States a line of structural steel shop power-driven machinery, such as

Putting Air to Work!



This recent DeVilbiss installation in a modern stove plant increased production three times. Porcelain enamel ground coat is applied to about 75% of all parts which were previously japanned and about 90% of white parts are now being produced in one coat.

Wind was first used as a source of power many centuries ago. It was harnessed to drive windmills in Persia as early as 915 (A.D.) and is still used by the Dutch to power the windmills that prevent flooding of the low countries.

Since 1888 The DeVilbiss Company has also specialized in putting air to productive work. Spray guns and complete spray systems designed and built by DeVilbiss apply the beautiful, durable finishes that increase the salability of today's best selling brands. But, that's only part of the story. In industry after industry DeVilbiss spray equipment is helping to save costly manhours... minimize rejections due to faulty finishes . . . maintain peak production . . . and reduce mounting costs.

If you are wrestling with high costs in your finishing department, consult a DeVilbiss engineer. He will show you many money saving advantages so characteristic of DeVilbiss spray systems.

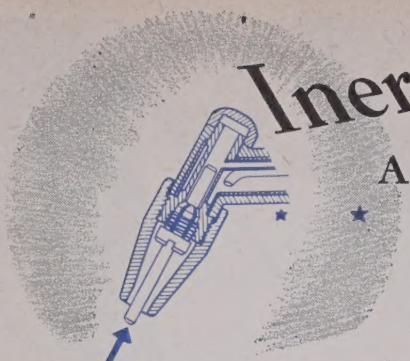
THE DEVILBISS COMPANY • Toledo 1, Ohio

Canadian Plant: WINDSOR, ONTARIO

DE VILBISS *means* **Quality** *in all four . .*

DV

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS



Inert Gas Method revolutionizes ARC WELDING

★ ★ ★ ★ ★

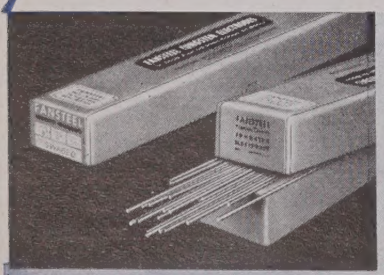
Tungsten Purity vital factor of its success

Premium Quality

Fansteel TUNGSTEN ELECTRODES

From the smallest to the largest setups, arc welding by helium, argon, or atomic hydrogen processes brings new superiorities, new simplicity, new economies. Applicable to a wide range of fabrications, arc stability is absolutely essential. This depends entirely on purity of the tungsten electrodes used. Fansteel Tungsten Electrodes assure this purity—with its saving in electrode consumption—for these reasons:

- Fansteel trained metallurgists and quality control engineers control every step of processing from raw tungsten ore to finished electrode.
- Every electrode must pass the most rigid inspection. Cracks, surface impurities, dimensional errors and all other imperfections are eliminated.



Available in three surface finishes: In diameters up to 3/32" in drawn finish; from 1/8" upward in swaged finish; for extra precision requirements in all diameters with centerless ground bright finish. Tungsten electrodes made by Fansteel are 99.9+% pure tungsten. Vapor pressure 0.000005 mm at 4580°F is the lowest of all metals.

You are invited to send for new Fansteel illustrated Bulletin 1.102 for complete information on Tungsten Electrodes—valuable to all arc welders. Fansteel Metallurgical Corporation, North Chicago, Illinois.

PURE METALS
Tantalum, Tungsten, Molybdenum, and Columbium in sheet, rod, wire and special shapes and parts.

POWDER METALLURGY PRODUCTS
Finished or semi-finished shapes and parts of special analysis to achieve high strength, density, electrical conductivity, resistance to wear, impact, heat erosion, or combinations of these and other properties.

COPPER BASE ALLOYS
Copper alloyed with other elements, to combine high conductivity with strength, elasticity, resistance to heat, impact, or wear. Available in bars, rod, sheet, strip, castings, forgings, finished or semi-finished parts, for current-carrying springs and other parts, soldering tips, resistance welding electrodes, dies and fixtures.

11604-B

Fansteel

SPECIAL PRODUCTS
In Controlled Metallurgy

punches, shears and combination machines. The machinery is manufactured in Europe.

F. R. DILLARD
Mgr., Machine Tool Dept.
Hendrie & Bolthoff Co.
Denver

● New York Commerce & Industry Assn., New York, whose membership includes most of the well established import-export firms in this area, can give you some leads. For west coast possibilities, you should contact the National Machine Tool Distributors Assn., Philadelphia.—Ed.

STEEL DRUM MANUFACTURE

Sir:

We shall esteem it a favor if you will let us know the identification number of the report on German practice in the manufacture of steel barrels and drums which was published by the Dept. of Commerce.

Standard Drum & Barrel Co.
Lierre, Belgium

● The report is entitled "German Steel Drum Industry" and carries identification number PB-34734. Copies can be obtained from the Office of Technical Services, Dept. of Commerce, Washington 25. The price is $3.00 for a microfilm copy, or $7.00 for a photostat.—Ed.

NONFERROUS SPECIFICATIONS

Sir:

We have found your booklet "Nonferrous Alloy Specifications" invaluable as a reference in our sales department. Would you please furnish the writer with 6 additional copies for distribution to our salesmen.

FRED SMITH
Whitehead Metal Products Co., Inc.
Philadelphia

● In orders of 5 or more, the booklets are 16¢ each.—Ed.

CAVITOMETER

Sir:

We would very much appreciate any information you have available on the Cavitometer which I understand was mentioned in one of your recent issues.

JOHN T. DAVIDSON
Chief Engineer
Standard Register Co.
Dayton

● Newsfront in the Sept. 16 issue mentioned the use of the Cavitometer for 100 pct inspection of cylinder head cavities in engines. H. H. Barnes, director, General Motors Proving Ground, Milford, Mich., can give you further information.—Ed.

FOREIGN MARKET CONTACTS

Sir:

If possible I would appreciate your giving me information concerning the procedure for obtaining contacts for fabricating structural and miscellaneous steel for foreign markets.

S. ABRAMSON
Interstate Iron Works
Newark

● Probably your best bet is to consult the New York field office of the Dept. of Com-

Who can foretell... the far-reaching benefits new Oakite cleaning methods will bring to tomorrow's metal-working operations?

We live in fast-moving times.

Four short decades ago, when industry first employed Oakite materials to improve upon old-fashioned soda-kettle washing practices, it little realized the startling progress that industrial cleaning was destined to achieve. Nor could it conceive how Oakite methods and service would contribute to the unerring precision, efficiency, and amazing speed required in today's streamlined manufacturing operations.

The record speaks for itself. Today, industry knows it can depend upon modern Oakite materials, methods and service to keep production volume at high levels . . . to keep unit costs low . . . to obtain uniform, durable, attractive product finishes that promote sales.

But production cleaning and its related techniques cannot be permitted to rest on past or present accomplishment. So the Oakite Engineering, Technical and Chemical Research Staffs are even today creating, testing and perfecting tomorrow's materials and methods that will contribute greatly in helping the metal-working industry reduce manufacturing costs in the years ahead. Oakite Products, Inc., 21A Thames Street, New York 6, N. Y.

Oakite Technical Service Representatives Are Located in All Principal Cities of the United States and Canada

OAKITE

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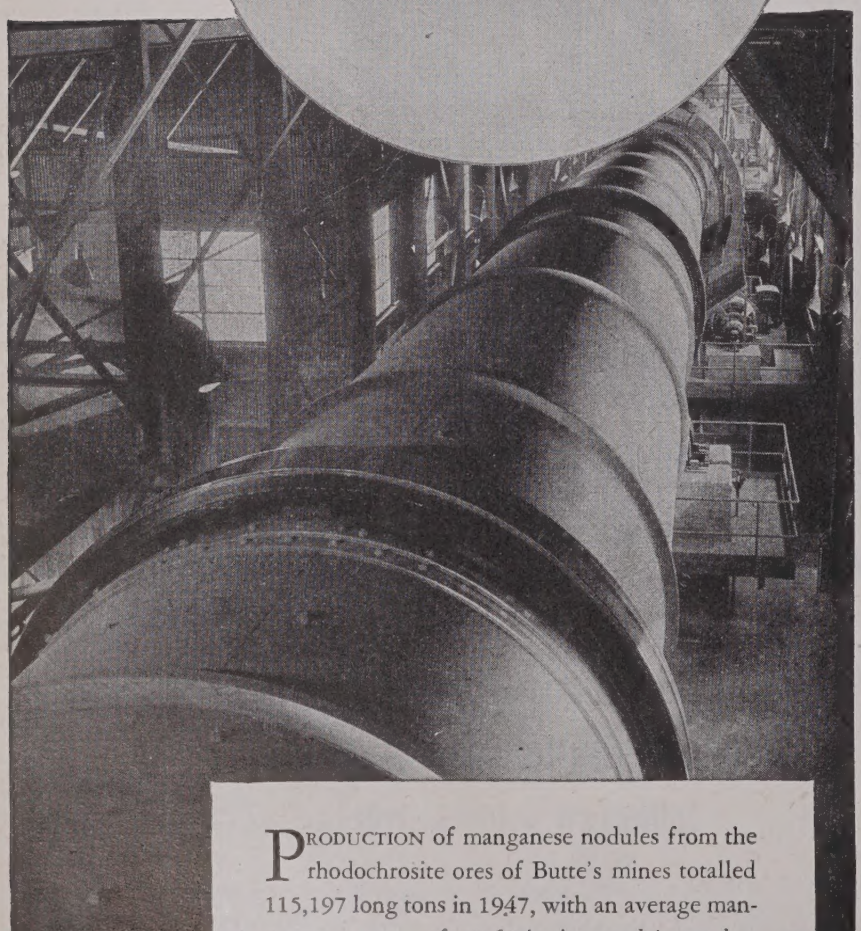
INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

Anaconda MANGANESE NODULES



PRODUCTION of manganese nodules from the rhodochrosite ores of Butte's mines totalled 115,197 long tons in 1947, with an average manganese content of 59.62%. Anaconda's production is the principal U.S. source of supply for producers of ferro-manganese and other consumers of metallurgical grade ore.

Illustrated above is the 270-foot kiln at the Anaconda Reduction Works in which the manganese concentrates are sintered at a temperature of 2600° F.

48356

ANACONDA
from mine to consumer

ANACONDA COPPER MINING COMPANY

Offices: 25 Broadway, New York 4, N. Y.

Anaconda, Montana

merce's Office of International Trade. Thi group is on the 60th floor of the Empir State Building and keeps listings of the for eign buyers of materials of all kinds.—Ed.

REFERENCE QUERY

Sir:

The last item in the bibliography with the article "A Critical Survey o Investment Casting," May 13, 194 issue, was entitled "What the Ma chine Designer Needs to Know Abou Lost Wax Investment Castings" wit the comment that this was yet to b published. Can you advise if it i now available?

GEORGE E. KINYON
Consulting Enginee

● The reference was an article which sub sequently appeared in the May 1948 issu of Machine Design. Reprints are available from Haynes Stellite Co., New York.—Ed.

PNEUMATIC RIVETERS

Sir:

Will you kindly give us the name and addresses of manufacturers o pneumatic riveters.

C. H. BLIEM
General Manage
Weatherly Steel Co.
Weatherly, Pa.

● A list has been sent.—Ed.

HYDRAULIC FLUID

Sir:

I would greatly appreciate it if yo would forward the name and manu facturer of the mobile, oily, nonin flammable fluid for use in aircraf hydraulic systems which was men tioned in Newsfront of the Nov. issue.

W. A. DICKINSON
Superintendent, Extrusion Dept
International Nickel Co., Inc., Huntingto Works
Huntington, W. Va.

● The fluid was a joint development o Monsanto Chemical Co. and Douglas Air craft Co., Inc. Either of them can give yo further information about the fluid.—Ed.

COLOR METALLOGRAPHY

Sir:

We would appreciate having tw copies of "Color Metallography" fron the Oct. 14 issue.

L. B. WALLACE
Chief Metallurgis
Revere Copper & Brass, Inc., Dallas Di Chicago

MACHINE SHOP NEED

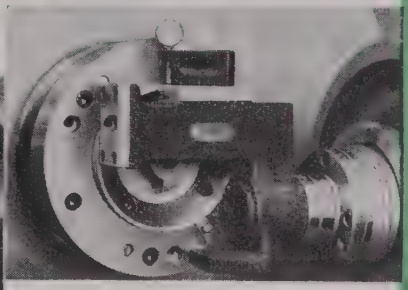
Sir:

Perhaps some of your friends ar sick of cold wet weather and shoul be told of the golden opportunity i McAllen, Texas, for a super machin shop. McAllen needs a machine sho with a small iron and a small stee foundry to serve the 1400 oil well located within 75 miles of the cit limits as well as the fast-growing oi fields 9 miles south of McAllen i Mexico. In addition, nearly all th

GLEASON WORK HOLDING EQUIPMENT FOR GLEASON MACHINES

CHUCKS
ARBORS
SET-UP GAGES
QUENCHING DIES

Designed for rigidity, concentricity, accuracy of size, with ample uniform force provided for holding the gear properly, ease of chucking and dechucking the gear.



Advantages of obtaining work holding equipment from the manufacturer of the machine itself:

KNOW HOW—full knowledge of machinery capacities and design features make it possible for us to design the most adequate work holding equipment for any given bevel gear job.

PROPER EQUIPMENT—to produce the highest quality of tooling much of the equipment used is of necessity special. This includes machining equipment as well as special gages and other inspection equipment.

UNDIVIDED RESPONSIBILITY—when work holding equipment and machines are ordered from us we alone are responsible.

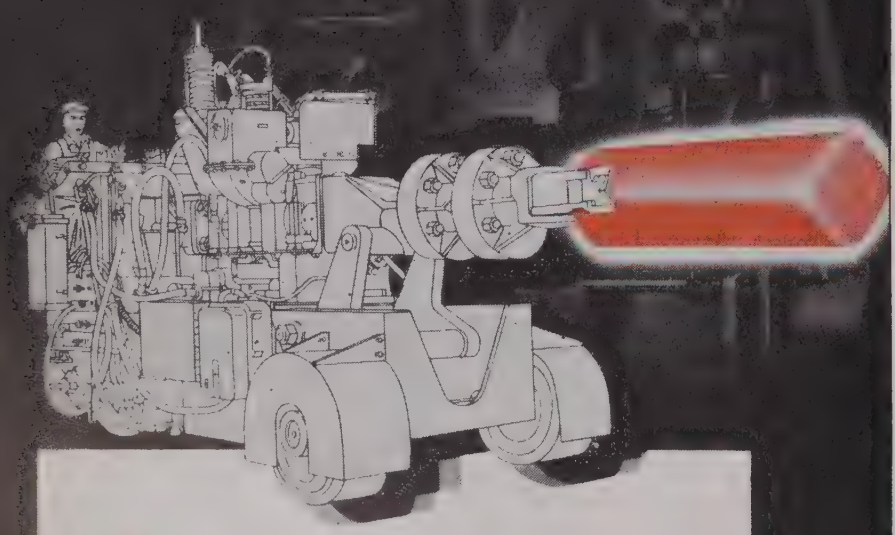
RELIABILITY—when ordering work holding equipment for existing machines, the tooling is properly designed to fit the particular machine for which it is ordered, wherever located.

Write for your copy of Gleason Work Holding Equipment today for further information.

GLEASON Works
1000 University Avenue
Rochester 3 N.Y. U.S.A.

Builders of Bevel Gear Machinery for Over Eighty Years

deft*



deft best describes a BROSIUS Auto Floor Manipulator at work in the forge shop. Deftly and quickly it draws or charges—moves with independent facility across the floor—raises and lowers and rotates the forging blank under hammer or press. Each unit has sturdiness and sensible engineering for which BROSIUS steel mill and blast furnace equipment is well known. BROSIUS manipulators will bring to your forge shop added safety, added speed, added economy —you should be using them. Write to us.

Edgar E. BROSIUS Company Inc.

SHARPSBURG • PITTSBURGH 15, PA.

foundry work done for 42 canning plants in the Valley has to be sent 236 miles to San Antonio. You'll be doing your readers a favor in telling them about this opportunity.

PAUL T. VICKERS
Manager
McAllen Chamber of Commerce
McAllen, Texas

IDENTIFICATION MARKINGS

Sir:

Do you know where we might obtain a list of steel bar identification markings as used by the various mills to identify products of their own manufacture.

H. BONNINGHAUSEN
Purchasing Agent
Aeroquip Corp.
Jackson, Mich.

● Apparently no such compilation has been made. Carbon steel bars are not generally marked by the mill unless the customer asks for identifying colors. Many of the large buyers have their own color systems, however, and pay an extra charge to have the mill paint the bar ends to conform to their particular system. For cold-finished bars, the same holds true although the mills themselves generally use their own color identification system in the absence of customer specifications. These color systems are not uniform throughout the industry. Also some mills stamp a letter or trademark on their cold-finished bars.—Ed.

PRECISION CASTING

Sir:

Will you please send me a copy of the article "Precision Casting with Plastic Patterns—The A.R.D. Process" which appeared in the Oct. 7 issue. Also I would like to have a copy of the book "Precision Investment Casting—Lost Wax Process." Kindly advise cost of these publications.

C. ROGERS McCULLOUGH
General Development Dept.
Monsanto Chemical Co.
St. Louis

● There's no charge for tear sheets of the article; but the book, which reprints a series of articles, costs $1.00. Copies of both have been mailed.—Ed.

DIAMOND POWDERS

Sir:

Will you please send me a copy of the article "Diamond Powder Increases Polishing Efficiency" which appeared in the March 13, 1947 issue.

ROGER F. WAINDLE
General Manager
Industrial Products Div.
Elgin National Watch Co., Sapphire Products Div.
Aurora, Ill.

ELECTROTINNING FORMULAS

Sir:

The article "Operational Formulas for Electrotinning Steel Strip" in the Dec. 2 issue has stimulated considerable interest in our organization and we would appreciate very much receiving two additional copies.

ELI SHAY
Application Engineer
Wean Engineering Co., Inc.
Warren, Ohio

The IRON AGE

Vol. 163, No. 6 February 10, 1949

THOMAS L. KANE
Publisher

o o o

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Production Manager

O. L. JOHNSON
Manager Market Research

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CHARLES T. POST
Manager Circulation and Reader Service

o o o

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Promotion Manager

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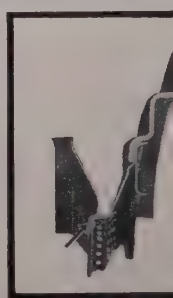

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A Solution

DR. POLAK is a Czechoslovakian intellectual who has just re-established contact with the outer world after enjoying some years of Soviet hospitality. When Adolf and Joe consummated their infamous pact by dividing Eastern Europe, Dr. Polak fell into the hands of his hosts. Having been a critic of communism in his native land he immediately provoked the curiosity of the NKVD. After intermittent—and not too subtle—interrogations plus a mellowing sojourn of nine months in a Moscow prison, he was hailed before a Soviet court. It took this tribunal of "the people" exactly ten minutes to find the doctor guilty and sentence him to seven years in a Siberian coal mine 400 miles inside the Arctic circle. Efficient is the word for Russian justice.

Switch back now to reactionary America where a fascist, war mongering government responding to sinister Wall Street monopolies, is seeking to snatch away the liberties and impair the usefulness of twelve defendants. These men happen to be the top hierarchy of the American communist party. A grand jury had meticulously explored the charges presented by the government to determine if these men should stand trial. The evidence strongly suggested the possibility of guilt.

The defendants however have not languished in jail. They have been free on moderate bail. Literally hundreds of propaganda mouthpieces, obeying Kremlin instructions, have shrilled the party line in defense of the culprits. The capitalist press has given them objective front page treatment. They have hired ample and able counsel. Party organizations have gathered a substantial defense chest. Mass demonstrations on behalf of the defendants have been organized. The city of New York found it necessary to assign a detail of 400 policemen to the trial. The judge has been threatened. Repeatedly defense counsel have sought to disqualify him. The American jury system has been challenged.

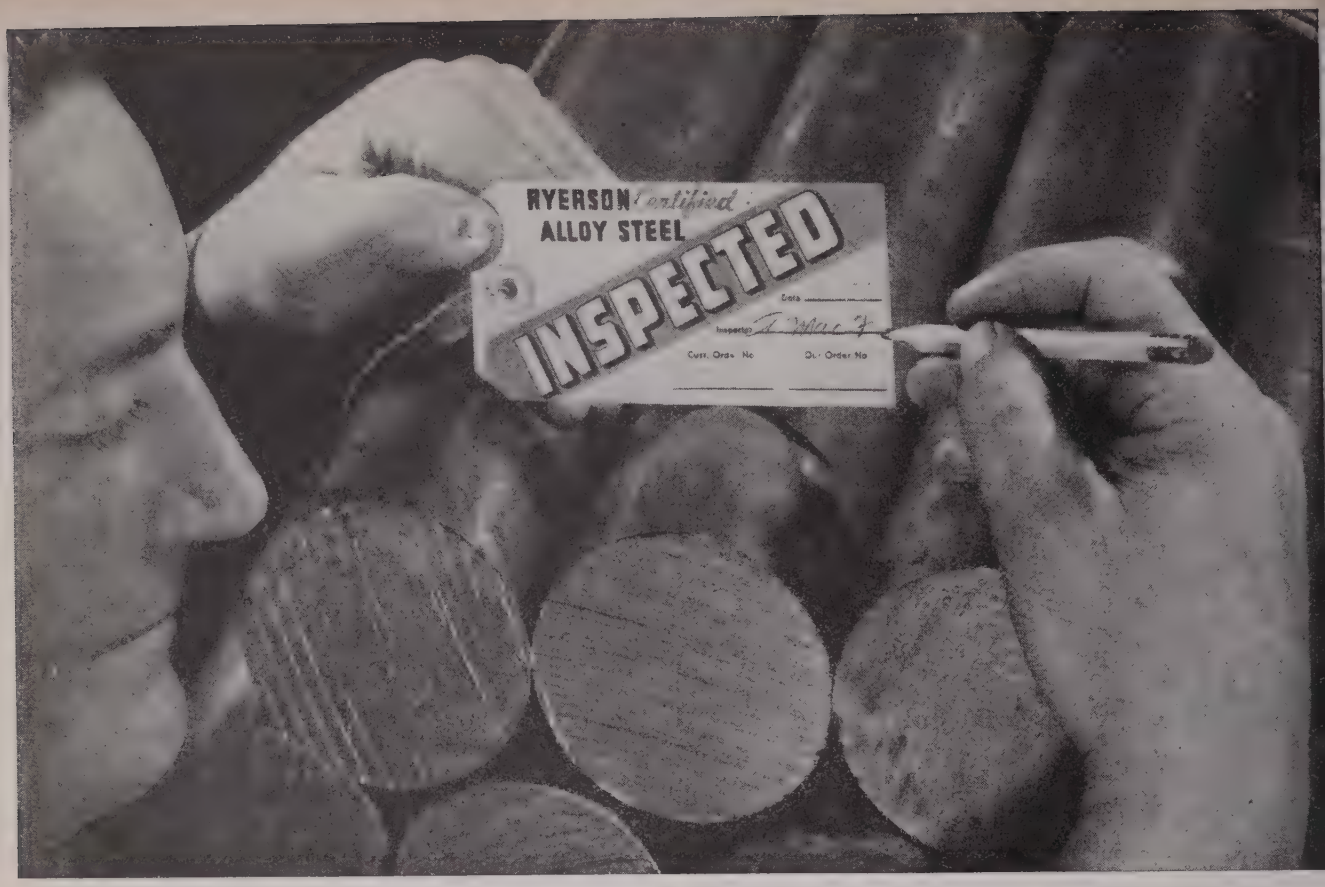
What is the charge? The men are the top officers of the American Communist Party. The party is dedicated to the violent overthrow of the American government. It is the admitted instrument of a foreign power. Its members are pledged to treason against the land in which they live. These seem like valid grounds for a trial.

Turn now to the Pacific coast where three professors at the University of Washington have been ousted for communist affiliation. Before this action was taken a special faculty committee listened to evidence for 33 sessions. The testimony covered more than 3000 pages. The men have the right of appeal to the American Association of University Professors. The president of the university must justify his action by law, reason and evidence. The case has been given full blown nationwide publicity.

The treatment of the communist cancer in this country has presented the honest liberal with one of his most excruciating dilemmas. To accord the communist that full freedom which is so basic in the liberal creed is an invitation to self-destruction.

We suggest here the application of a juridical practice common everywhere during the Middle Ages. When a foreign merchant commited a crime he was tried under a peculiar code known as the law merchant. It subjected the defendant to the law of his native land. What could be more fair—or more practical—than to accord to communists precisely the same justice which prevails in the land to which they owe allegiance?

Joseph Stagg Lawrence



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► Application of metal coatings by decomposition of gaseous metal carbonyls is being developed in a midwestern laboratory. Interest and effort so far have largely been on nickel deposition, but any metal that forms nickel carbonyl can be deposited. The work is out of the laboratory phase and in the pilot stage. But no commercial applications have been set up as yet.

► Many steel consumers have experienced a decline in their business. All the mills say there is no perceptible letup in steel demand. None of the various consumers agrees as to what the future holds in store, with one exception. If we are in for a good slump--the steel mills will probably be the last group to learn about it.

► The electric power industry, fighting a battle against constantly increasing fuel and construction costs, has managed to continue lowering its rates over a period of decades. The lower rates have been made possible by the use of larger installations operating at higher temperatures and pressures. Heat resistant alloys have become necessary for supercharger tubing which operates in the most recent installations at a steam temperature of 1050°F. Metal temperatures range around 1250°F.

► The constant addition of new gadgets and accessories on passenger cars has sent battery requirements soaring. In 1930, 12 amperes of current were ample for most generators. In many 1949 cars, the required amperage is up to 40 or even 50 amps. Starters, radios, heaters and headlights are the biggest current users.

► Sources in the trade point out that a reduction of manganese content in steel is being considered. How much of a reduction would be practical in still maintaining normal steel quality is a big question and would be open to extensive exploration. However, such information would be of tremendous importance in case of a national emergency.

► Latest official figures show that wartime facilities so far sold by the Government have returned 35¢ on the invested dollar. These sales include 105 of the original 149 steel properties built by the Government. This is double the return realized on surplus sales as a whole.

► Iron coated paper which has greatly simplified photoengraving processes so far has employed a casein compound to make the iron powder adhere to the paper. A new paper just developed employs a plastic.

► What is claimed to be the first Belgian looping rod mill in which squares and ovals are repeated automatically is now in operation. Rods are handled through 13 passes by air-operated automatic manipulators.

► Steel companies are beginning to feel the effects of postwar expansion in the form of increased taxes on machinery. U. S. Steel's bill, now being appealed, will be boosted by $1.5 million in the Pittsburgh district alone.

► Freight car builders are worried sick about spring and summer business. It isn't in sight. The roads ordered only 568 cars in January plus some from a stock order put through by a carbuilder. At this rate some 125,000 tons a month of steel plates, shapes, bars and sheets will soon be available for other customers unless someone -- possibly the Government -- gets more orders on the books.

► Application was recently made to the British patent offices for the Raney method of making permanent magnets. One American company has prepared a magnetic iron oxide powder by this method. It is said to have an oxy-ferritic matrix with Fe_3O_4 dispersed in a submicroscopic form throughout the matrix. X-ray diffraction shows that the iron lattice is highly distorted which presumably gives rise to the unusual magnetic properties obtained with compacts from this powder.

► Order cancellations have had no overall effect on steel mill operations so far. But if they continue at present rates, mills may soon be unable to find a buyer every time someone cancels or defers an order.

► Hand fitting of pistons in auto plants is on the way out. In one plant, special device measures cylinder bores at four locations and classifies them into eight different sizes. Another machine measures 500 pistons an hour and classifies them according to matching cylinders. The entire operation requires only a few seconds of time for each engine and is said to be practically foolproof.

► A new automatic electronic control which provides exact weight for a drill bit as it penetrates oil-bearing formations thousands of feet below the earth's surface has been developed by a leading manufacturer of oil-field equipment. Early tests have shown encouraging results.

Metal

By E. L. H. BASTIAN

Staff Engineer,
Shell Oil Co., Inc.,
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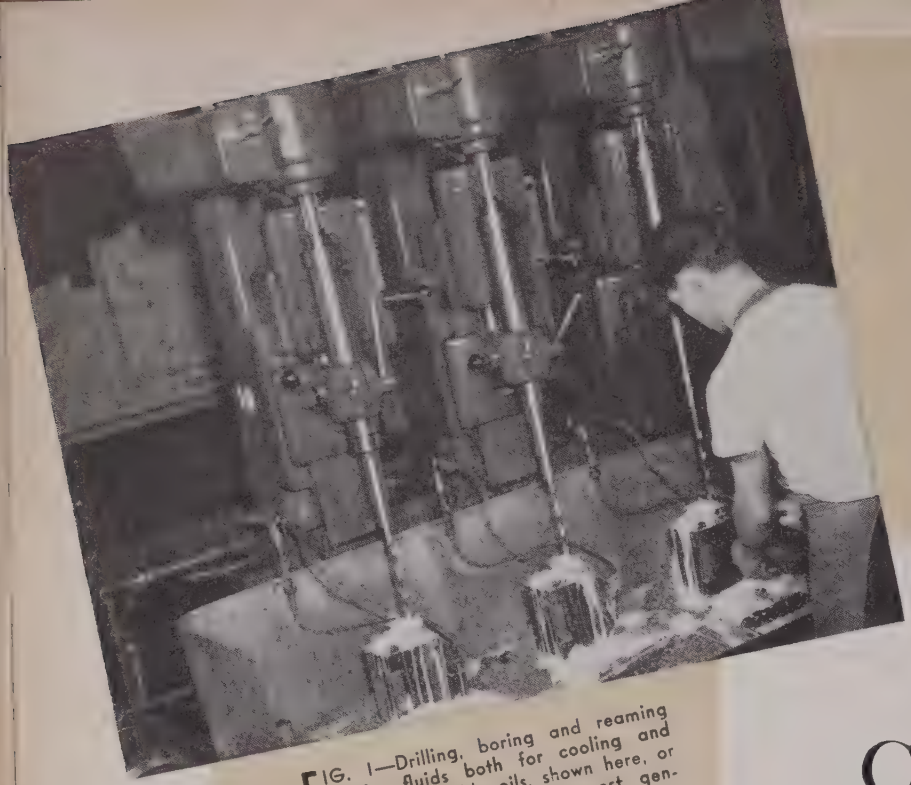
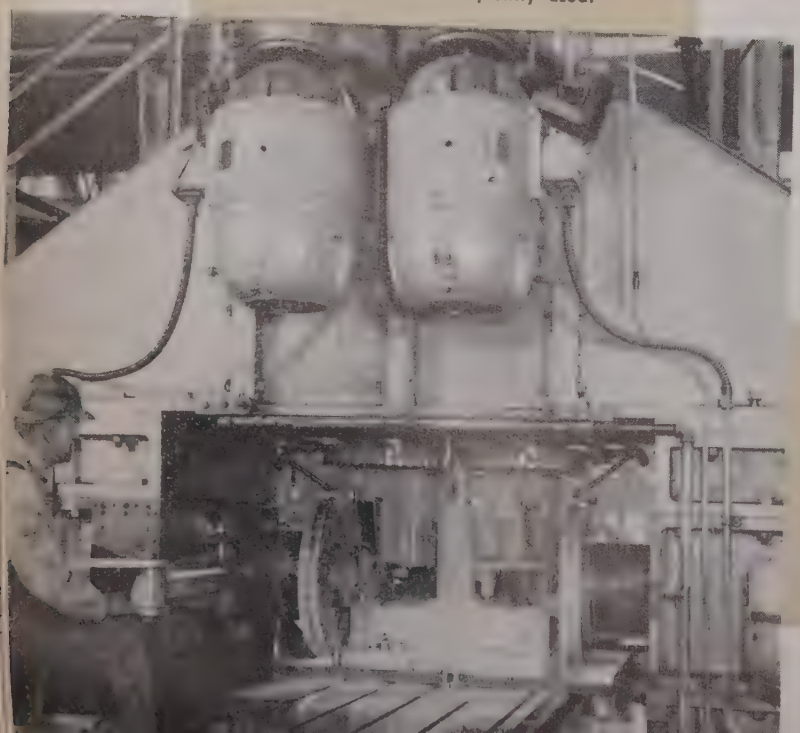


FIG. 1—Drilling, boring and reaming require fluids both for cooling and lubrication. Soluble oils, shown here, or sulfurized mineral oils are most generally used.

FIG. 2—In milling the top and both sides of this steel transmission case, cutting fluids are important to the operation. In milling steel, sulfurized mineral-fatty oils are frequently used.



CUTTING fluids, since their introduction almost 70 years ago have always had the same purposes, although recognition of these purposes has only recently been acknowledged. This development of definition of cutting fluid purposes has been largely based on an increasing accumulation of data and information on how a cutting fluid functions and how it needs to function in new and different machines and machining processes.

Cooling was the first purpose to be recognized. F. W. Taylor about 1885 discovered that by playing a stream of water on a turning tool, cutting speed could be increased by about 30 pct. Water is an excellent coolant and is used in many modern emulsion-type cutting fluids. These products, however, go far beyond the simple characteristics of water to fulfill other recognized purposes of a cutting fluid.

Cooling dissipates frictional heat generated by rubbing of the chip over the tool face as well as the heat resulting from plastic deformation of the chip metal. By whatever other means such heat can be prevented or minimized, in just that proportion will the need for cooling, as a purpose of the fluid, be reduced.

The second purpose of the cutting fluid is to lubricate the tool and chip. This implies a re-

Cutting Fluids

—their Selection, Application and Maintenance

duction of friction between the two, which in high speed machining is important from the standpoints of tool wear and power consumption.

The third purpose of the cutting fluid is to prevent welding or adhesion of metal on the tool point, important in preserving a proper cutting edge on the tool and obtaining a good product finish. The use of chemically active agents, such as sulfurized or chlorinated compounds, in cutting oils is common practice to avoid a built-up edge on tools and rough surfaces due to a sloughing-off of such built-up edges onto the finished face of the work.

There are essentially two important commercial types of cutting fluids: (1) Cutting oils, used neat at the machine, and (2) water soluble oils or compounds, mixed with water to form an emulsion or solution for use at the machine. The use of other fluids, such as air or water alone, is extremely limited. Of the cutting oils used neat at the machine there are two classes, inactive and active.

These terms, *inactive* and *active*, relate to chemical activity or the ability of certain constituents in the oil to react with the work surface to change the condition of cutting. Such reaction is ordinarily a direct function of temperature, pressure, and susceptibility of the raw metal surfaces.

The inactive oils are usually straight mineral oils or mineral oils to which a proportion of fatty oils, fatty acids, sulfurized fatty oils, or fatty oil replacements has been added. The proportion used varies with the application requirements, but ranges commercially from about 5 to 30 pct. Fatty oils commonly used are lard oil, tallow, sperm, rape seed oil, and some of the fatty acids, principally oleic. A breakdown of these types of cutting fluids is shown in table I.

These oils are used as cutting fluids on copper or copper bearing alloys which more chemically active oils would discolor. A standard test procedure for determining activity of cutting oils is to immerse a copper strip in a bath of the oil held at 212°F for 3 hr. If the strip is not discolored or only slightly tarnished, the oil is usually rated as *negative copper strip corrosion* and is considered inactive. In many applications, particularly in nonferrous machining, the inactive type oils meet all requirements for good machining and have the additional advantage of not staining either the work piece or brass parts of the machine tool. This is important in certain machines that employ brass or bronze

No other element in metal machining can be so troublesome as improper cutting fluids. What a cutting fluid must do and how it must do it, and how it should be selected, applied and maintained are described in this comprehensive, helpful review of modern metal cutting fluids.

gibs and slides that, if subjected to continuous staining, would eventually corrode and stick.

Lard oil may be classed as an inactive oil. However, it is costly and has other operating disadvantages. Odor development, rancidity and susceptibility to rapid bacteria propagation, resulting in possible dermatitic effects on workers' skin, have all weighed against its use as a cutting fluid. Inactive mineral oil blends successfully replace lard oil on both a performance and cost basis. The latter factor, in these times especially, is no small item.

Active mineral cutting oils (see table I) are the most widely used in production machining today. These oils may be made in several ways dependent upon the method of incorporating the chemically active constituents, which are usually either sulfur and/or chlorine, and sometimes small amounts of phosphorus. The common commercial types total six, as shown in table I. No. 1—Heavily sulfurized mineral oils have the sulfur, usually as flowers of sulfur, cooked into the oil at a high temperature. Such oils are very dark or black in appearance and have a pungent odor.

No. 2—A No. 1 oil with fatty oil or sulfurized fatty oil and fatty acid combined with the sulfurized mineral oil.

No. 3—Combinations of light viscosity mineral oils with either No. 1 or No. 2 oil. Such dilutions are often made right in the shop where heavy oil is used for such heavy duty cutting as broaching, and diluted with from one to ten parts of mineral oil for less severe cutting.

No. 4—This light, transparent mineral oil incorporates sulfur or sulfo-chlorinated compounds. Many prefer these cleaner handling, transparent oils because they permit observation of the work while cutting and do not interfere as much in reading gages and mikes used on the job. In this respect they share some of the advantages of the inactive type oils, usually light in color and transparent. However, the active transparent oils are quite suitable for more severe cutting conditions. Many exceed in performance some of the black sulfurized oils that have heretofore been considered the heavy-weights among cutting fluids.

No. 5—This type is the same as No. 4 oil except that fatty oils and fatty acids, either alone or containing sulfurized or sulfo-chlorinated compounds, may be contained in varying proportion depending upon the intended application.

No. 6—Combinations of light viscosity mineral oils with either No. 4 or No. 5 oil, depending upon application requirements.

Water soluble oils or compounds represent the second important group of commercial cutting fluids. These products when mixed with water ordinarily form an emulsion rather than a true solution. There are some commercial products available that do form solutions in water. Whether emulsion or solution, the end product depends not so much on which it is but rather on the balance of properties designed into the mixture.

The most commonly used soluble oil is a medium viscosity mineral oil containing an emulsifier base or soap plus a coupling agent to form a homogeneous fluid. The emulsifier may consist of sulphonates, acid sludges, glycols, saponified phenols or naphthenic acid, and the coupling agents may be alcohols of several types. The soluble oil may contain fatty oils, fatty acids, a wetting-out agent, active chemical additives, water softening agents, germicides, and some water. All such soluble oils are usually liquid, and mix readily with various proportions of water to form the coolant used at the machine.

Paste type compounds are usually composed of combinations of various soaps, fatty oils, fatty acids, and water. They may contain mineral oils, other emulsifying agents, resins, active chemical additives, and germicides, depending upon the intended application of the coolant. The pastes usually mix well with water to form an emulsified coolant, which is usually higher in lubricity than soluble oil emulsions. The free fatty acid content is based on application requirements. However, by proper formulation, soluble oils may be made to possess unusual properties for special applications.

Several heavy-duty type soluble oils have, in a number of machining applications, displaced active compounded mineral oils. When formulated to contain the desired active chemical compounds, the heavy duty soluble oils compare favorably in performance with the mineral type and have superior cooling properties and low cost. Where difficulty is encountered with smoking and fogging of mineral oils because of high heat generation at the tool point, heavy duty soluble oil is frequently the answer. However, tool life with soluble oils, dependent upon the severity of operation, is not usually as good as with the mineral oils. Whereas the soluble oil or compound emulsions are predominantly coolants, mineral oils are lubricants. Either may be en-

TABLE I

Types of Cutting Fluids*

Classification by Principle	*Classification by Use*
I Inactive Type Coolants	I Air
A—Air	II Water
B—Water	III Fluids Used in Solution or Emulsion Form
C—Conventional soluble oils	A—Conventional soluble oils
D—Conventional paste compounds	B—Conventional paste compounds
II Inactive Type Lubricants	C—Heavy duty soluble oils
A—Straight mineral oils	D—Heavy duty paste compounds
B—Straight fatty oils	IV Fluids Used in Neat Form
C—Mineral-fatty oil blends	A—Straight mineral oils
III Chemically Active Type Fluids	B—Straight fatty oils
A—Sulfurized mineral oils	C—Mineral - fatty oil blends
B—Sulfurized mineral-fatty oils	D—Chemically active oils
C—Sulfo chlorinated mineral oils	1—Sulfurized mineral oils
D—Sulfo chlorinated mineral-fatty oils	2—Sulfo chlorinated oils
E—Heavy duty soluble oil (additive type)	3—Sulfurized mineral-fatty oils
	4—Sulfo chlorinated-fatty oils

**These classifications designate the principle and general use, but not necessarily the exclusive functions of the cutting fluids listed.*

dowed with the necessary characteristics of a cutting fluid; cooling, lubrication, and chemical activity to favor optimum cutting conditions. The balance among these several purposes depends in large measure on the application requirements.

The general cutting oil requirements of any fluid in which the production machine operator is interested is usually influenced by:

1—Cutting ability, including rate of metal removal, surface finish of work, and tool life.

2—Prevention of corrosion on work or tool.

3—Prevention of work discoloration.

4—Service behavior of the fluid, regarding smoking or fogging, odor, stability and freedom from separation, and toxicity, dermatitic, and other physiological effects.

Every machinist realizes that metal removal rate, work finish and tool life must be considered in conjunction with the nature of the cutting operation, the feeds and speeds used, the type of tool employed, and the metallurgical characteristics of the work material. Any discussion of the nature of operation involves the fundamental physics of the chip formation, wherein the factors of friction, pressure, temperature changes, heat flow, and internal dynamic forces play a part.

In selecting a cutting fluid for a particular machining operation, it is desirable to consider first the old question of emulsion coolants or oil type fluids. In some cases, particularly since the advent of the heavy-duty soluble oils, there may be a choice of either with comparable performance. If this is so, cost will then probably influence the decision. If cooling is the predominant requirement, the emulsion or water solution is best. If extremely severe service is anticipated where lubrication and anti-welding needs are paramount, then the mineral type oil should be used.

Various machining operations on various materials require different cutting fluids. Table II is an outline of the cutting fluids most often used. Where blanks appear in the tabulation, no cutting fluid is ordinarily used. At best, the recommendations in the table can be considered only as a general guide to the selection of cutting fluids, since any machine operator knows that circumstances alter cases.

Broaching may be either horizontal or vertical and either internal or surface. Horizontal internal broaching generally requires a heavier bodied, more chemically active oil than vertical surface broaching where speeds, cut, and work material are the same. The heavier bodied oil clings better to the horizontally moving broach, and chemical activity of such oil aids in efficient cutting. For light duty, vertical surface broaching on mild steels, even soluble emulsions may be used.

Tapping and threading are usually best done with active type mineral-fatty oil blends, which provide lubricity for the relatively low surface cutting speeds encountered.

Gear cutting, shaping and shaving are done in a variety of special machines. Usually active type mineral blends are employed.

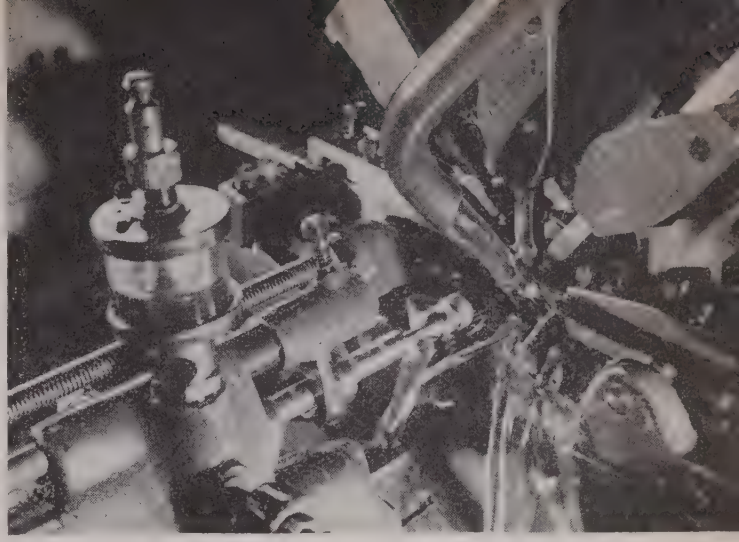


FIG. 3—Because automatic screw machining involves a variety of operations at a variety of cutting speeds, a light viscosity, chemically active oil containing some fatty oils is best for general usage.

Drilling, boring and reaming present requirements for lubricity or oiliness to prevent chatter and heat generation, and suitable cooling to carry away the heat. Soluble oils, as used in fig. 1 or sulfurized mineral oils are most generally used. A technique called "hyper drilling" now offers possibilities for much higher drilling rates with even ordinary soluble oils. This technique is based on a means for rapid chip and heat removal from the drill point.

Milling is not ordinarily considered a difficult operation. However, care must be given to proper oil selection to provide cooling, prevent chatter and give good finish. Chip breakers are sometimes employed to improve operation. A good flow of oil, properly directed, aids in getting best results. In milling steel, soluble oils are usually used, as in fig. 2. For other metals, table II will serve as a guide.

Automatic screw machining involves a large number of types of operation at various speeds. These include turning, forming, drilling, reaming, tapping, threading, knurling, etc. Usually a light viscosity, chemically active oil containing some fatty oils is found best for general usage, as in fig. 3.

Planing and shaping are usually done without the aid of cutting oils, although on heavy duty planing of locomotive frames, for example, a rich soluble emulsion is sometimes swabbed on the frame surface.

In turning and other single point forming operations, cutting oils used depend on speed, feed and type of work material. Either emulsions or oil types are generally suitable. An emulsion type cutting fluid is being used in fig. 4.

Reciprocating hack sawing, continuous circular sawing, or band sawing usually employ soluble oils. These oils serve to clear the teeth, prevent chip adhesion and heat generation, and minimize vibration of the blade by cushioning its cutting action.

Thread rolling does not offer much of a problem since various types of oils have been suc-

cessfully used. However, attention should be given to such details as die life and discoloration of bronze bushings in machines.

Grinding, including honing and lapping, is a special form of metal cutting, and its intricacies and problems are well known. In general, grinding operations may be one of two kinds, 1—where prevention of high heat generation is necessary, and 2—where cooling only is required.

Representative of the former are thread grinding and honing where compounded active type mineral oils are generally used. Such oils perform better than emulsions with the fine grit, dense wheels used. Emulsions tend to load up the wheel and glaze the grinding surface too rapidly.

There are several classes of grinding oils commonly used that may be designated as hard, medium, and soft oils, respectively. Hard oils, the most chemically active of the three, are recommended when grinding tough alloy steels in the lower grinding hardness range (Rc 20 to 30). Such metals are chromium-nickel, stainless, and other similar steels. Hard oil is also recommended for internal thread grinding where peripheral speeds are somewhat lower. Such oils tend to make the soft wheel used on these materials act harder, hold its form longer, and produce better finishes.

Medium oils are used in a broad range of thread and form grinding operations on steels of medium grinding hardness (Rc 30 to 45).

Soft oils are used in grinding very hard steels (Rc 45 or higher), such as hardened tool steel (gages, taps, etc.), where burning and surface discoloration from grinding is a problem. Soft oils tend to make the hard wheels used on such work act softer and break away more readily to avoid glazing and burning of the ground surface. These oils are usually the least chemically active of the three classes and contain a high proportion of free fatty oils. Thread grinding oils are generally higher in viscosity (S.S.U. 300 to 350 at 100°F) than other cutting oils. This is desirable to minimize fogging of the oil from centripetal action of the high speed wheel. Also, the flash point of the heavier viscosity oil is higher, which ordinarily precludes fire hazards.

Representative of grinding wherein cooling action alone is adequate, are cylindrical, centerless, and surface grinding. These jobs are usually done with an emulsion as a coolant, as shown in fig. 5.

Grinding requires certain properties in the coolant. In addition to those mentioned under the subject of metal cutting, the following are necessary: 1—A cutting fluid should have suitable wetting-out action to insure a continuous film on the work piece. 2—it should not have any tendency to form gums or residue, nor load up the grinding wheel. 3—it should settle chips, dirt and grits readily in the settling tanks to avoid carryover and scratching of the work piece. 4—it should resist rusting tendencies even in the dilute emulsions used in grinding. 5—it should not affect the bonding material of the wheel. 6—it should, for some types of work, be clear and translucent so that work in process can be observed.

To meet these requirements several types of grinding fluids are available. They are: (1) Soluble oils to produce opaque emulsions; (2) Soluble oils to produce translucent emulsions, and (3) Grinding paste-type compounds.

The opaque, milky white emulsion as commonly used, is generally made up from soluble oil, although paste type compounds of the unpigmented variety also are used. As coolants, such emulsions are inexpensive, efficient for many kinds of grinding and, if properly formulated, cope with most difficulties encountered such as water condition, ordinary contaminants, mixing problems, and operating requirements both on rough and finish grinding jobs.

Translucent grinding emulsions, prepared from special soluble grinding oils containing a high proportion of emulsifier base, are adapted for use in fine finish grinding to close tolerances.

TABLE II

Recommended Cutting Fluids for Various Machining Operations

	Broaching		Tapping and Threading	Gear Shaving	Gear Cutting and Shaping	Drilling and Reaming		Boring	Turning	Automatic Screw Machinery	Milling	Thread Rolling	Grinding			Legend
	Internal	Surface				Ordinary	Deep Hole						Thread Grinding	Form	Plain	
Aluminum	F	F	H	...	...	C	C	C	C	C	C	D	H	H	F	INACTIVE COOLANTS:
Brass	F	F	F	F	F	C	C	C	C	F	F	F	...	...	...	(A) Air
Bronze:																(B) Water
Medium	F	F	F	F	F	F	F	F	F	...	F	F	...	...	...	(C) Soluble Oil
Hard	E	F	E	F	F	F	F	F	F	...	F	F	...	...	...	INACTIVE LUBRICANTS
Copper	F	F	F	...	...	C	F	C	C	C	C	F	...	...	...	(D) Straight Mineral Oil
Magnesium	F	F	F	...	...	D	D	D	D	D	D	D	D	D	D	(E) Straight Fatty Oil
Monel	H	H	H	H	H	G	G	G	G	H	H	G	...	...	...	(F) Mineral-Fatty Oil Blends
Nickel								Q	G	H						CHEMICALLY ACTIVE FLUIDS
Cast Iron { Hard	C	C	C	...	...	...	C	C	C	H	C	...	...	...	...	(G) Sulfurized Mineral Oil
Cast Iron { Soft to Med.	C	C	C	...	...	...	C	...	...	...	C	...	...	...	...	(H) Sulfurized Mineral-Fatty Oil
Steel:																(I) Sulfo-Chlorinated Mineral Oil
To 0.30C	G	G	G	G	G	G	G	C	C	F	C	H	L	L	C	(J) Sulfo-Chlorinated Mineral-Fatty Oil
Over 0.30C	H	H	H	H	H	H	H	G	G	G	C	H	M	M	C	(K) Heavy Duty Soluble Oil (Additive Type)
Heat Treated	H	H	J	J	J	K	K	G	G	H	K	K	N	N	K	GRINDING OILS
Steel, Alloy	J	J	J	J	J	K	K	G	G	H	K	K	N	N	K	(L) Hard—High Chemical Activity
Steel, Stainless	J	J	J	J	J	J	J	K	K	H	K	K	M	M	K	(M) Medium—Medium Chemical Activity
																(N) Soft—Low Chemical Activity

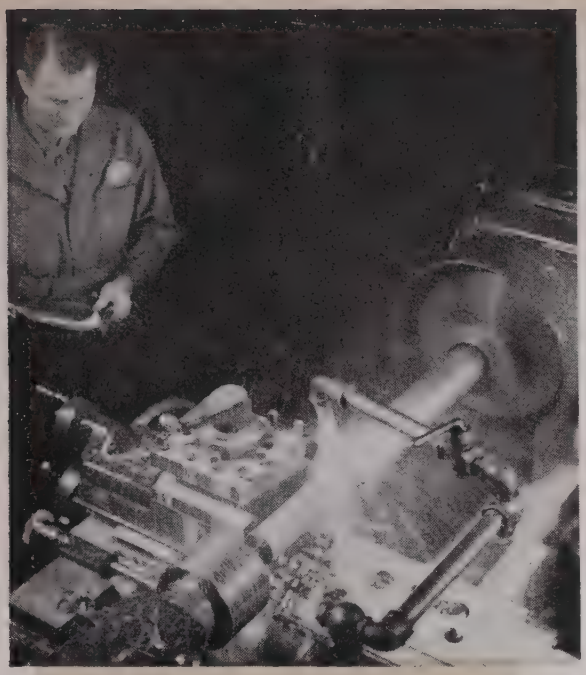


FIG. 4—Single point tool forming operations can be done with either emulsions, as shown here, or oil type cutting fluids. The cutting fluid used depends upon speed, feed and type of work material.

In addition to being good grinding coolants, they permit the operator to observe the point of contact between wheel and work. This is important when the wheel is being brought to the work. With opaque coolants, because the operator cannot see through the cascade of liquid, he may temporarily shut off the coolant flow and burn the work.

In concentrated form, high soap content soluble oils of the type that form translucent emulsions cost more than ordinary soluble oils. They actually cost less in emulsion form at the machine. This seeming paradox is because of their special formulation they can be diluted with almost twice as much water as conventional oils. While the latter are usually mixed with from 20 to 40 parts of water, translucent type soluble oils operate successfully with from 70 to 100 parts water.

Their operating superiority for precision grinding also makes for economy in consistently better production and better finish, which means fewer rejects. They combine the transparency and low surface tension of cheap sal soda solutions with the good rust preventive, non-foaming character of modern soluble oils. They do not attack resinoid or shellac-bonded wheels, as is apt to occur with sal soda solutions. The latter also are liable to affect paint on machines and contribute to operator skin and eye ailments if in too strong solution.

Paste-type compounds should be of a high soap type for best results. These emulsions may contain some fatty oils to impart lubricating film properties, but an excess of fatty oils may contribute to wheel loading and to gumming of the system. Also, chip settling may be slowed down by too high a fatty content.

Paste-type compounds usually are mixed with several parts of water, preferably hot. This mixture is agitated thoroughly to produce a heavy slurry, which in turn is diluted with 70 to 150 parts of water for use. Since soluble oils are more easily mixed for service, they are often preferred over pastes.

If properly selected, mineral cutting oils ordinarily require no special precautions in application except that reasonable maintenance procedure be used. Soluble oils, however, require not only careful selection, but also proper preparation of emulsions and maintenance in service.

In preparing emulsions, the oil should always be added to the water and agitated thoroughly while being added. The quantity of water should be at least six to seven times the quantity of oil. After this initial emulsion has been made, additional dilution with water to any desired proportion can be easily made. While for some soluble oils, hot water 160°F is necessary to obtain stable emulsions, in most cases cold tap water is entirely satisfactory. If, however, good agitation of the mix is not made while the oil is being added to the water, some of the soap combining with the water may cause a separation of mineral oil that accumulates as a permanent layer on top of the emulsion.

If insufficient water is used in the initial mixing or if the water is added to the oil, an invert

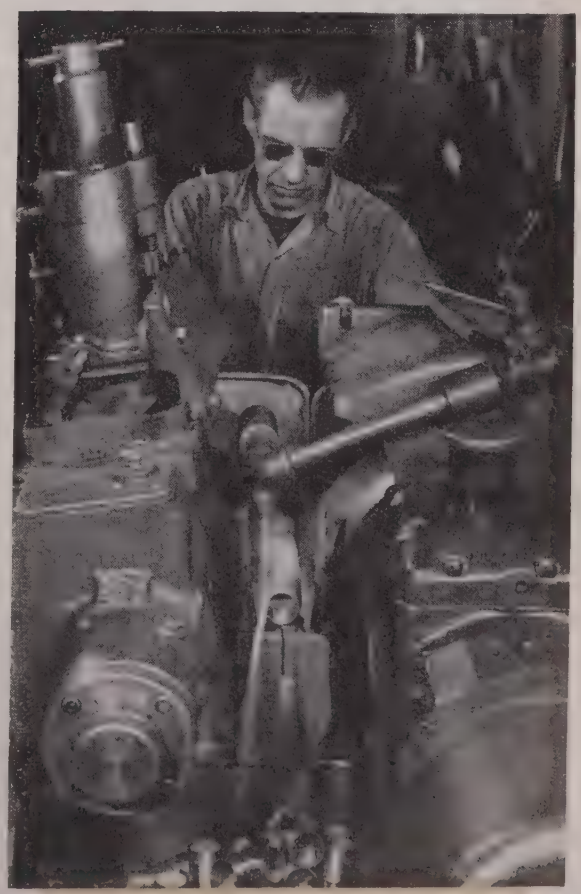


FIG. 5—In grinding, where cooling action alone is adequate, such as in cylindrical, centerless and surface grinding, emulsions are used.

emulsion may occur. Such an emulsion is characterized by a thick, slimy appearance. While suitable for some drawing applications, invert emulsions are undesirable for most cutting and all grinding uses. In grinding, an invert emulsion would quickly load the wheel.

Characteristics of the water used in preparing an emulsion are important. Soft waters present no problems, but hard well waters (300 to 700 ppm) which sometimes contain minerals or salts make for some difficulty in preparing uniform stable emulsions. Ordinary emulsions made with hard water tend to break readily, separating upon standing into a stratified condition wherein a layer of oil or heavy creamy emulsion floats on the surface of a much leaner emulsion than was originally prepared. Such separation is often detrimental to good coolant efficiency, and in grinding, severe wheel loading results.

Before an emulsion is put in the machine system for service, certain precautions should be taken. First among these is cleanliness. The importance of this point in handling emulsions cannot be overstated. The system itself should be thoroughly washed out and flushed. Deposits of any type should be removed, with particular attention being given to corners, angles, and pockets where these may collect. Soluble oil emulsions are susceptible to contaminants. If there is any reason to suspect the presence of bacteria in the previous coolant contained in the system, a flush of the cleaned out sump with a germicidal solution would be desirable before putting in the new coolant. These precautions will insure maximum usefulness of the new emulsion and avoid premature separation of emulsion, development of odors, and bacteria propagation.

Care of the emulsion while in service is desirable. Extraneous contaminants, such as dirt, chemicals, food particles, oil or grease, should be avoided. Chips, grinding grits, and dust, formed in the operation and carried into the coolant system, should be removed regularly by suitable settling tanks, filters, and strainers.

Germicides may be introduced in the coolant to minimize and control bacteria growth. Many good soluble oils and compounds are sold containing them. Where they are not so introduced, a water soluble germicidal solution is often added directly to the emulsion. Bacteria or germs may enter the coolant system in the water, particularly hard water containing mineral sulphur-bearing compounds, or through contamination by contact with a workman having an infection on hands or arms.

Industry practice varies regarding the length of time a coolant is kept in service. It may vary from a week to six months, depending upon use of the machine, maintenance of cleanliness, shutdown practice, temperature control of coolant, and control of emulsion concentration. Obviously, a high rate of production accelerates contamination of the emulsion from chips, grits, dust and dirt. Continuous operation, however, serves the useful purpose of continual aeration of the emulsion. Where machines are shut down over a weekend, particularly in the summertime, a scum forms on the stagnant emulsion. In warm weather, this is conducive to bacteria growth, odor development, and general deterioration of the emulsion. It can be combatted by maintenance of cleanliness, suitable germicides, and aeration.

Cooling the emulsion not only extends its service life, but it has been proved by tests to yield better machined finishes, better production and tool life. An optimum temperature range for emulsions used in machining is 55° to 70°F. Cooling can be accomplished by use of fins and air passages, fan drafts, cooling coils and water jackets, or by mechanical refrigeration.

Another control for better service of emulsion coolants, that is not given the attention it deserves, is control of the emulsion concentration. In use as a coolant, emulsions undergo a continual change in relative compositions. In some heavy duty cutting heat generated at the tool point may evaporate the water faster than oil is carried off on the machined pieces. This could result in such a high ratio of oil to water than an invert emulsion would form, causing loss of all the coolant and necessitating down time on the machine for system cleaning and change of coolant.

In grinding, oil carryoff is usually such that the emulsion concentration becomes increasingly leaner with service. This change may progress to a point where rusting and emulsion instability occur.

The use of the Shell E.C. Test Flask and Calculator or some similar method is recommended for maintaining concentration control of emulsions. Fundamentally, all control methods are based on two steps. First, a sample of emulsion from the operating system is broken; i.e., soap, fat, oil, etc., are separated from the water by addition to the sample of a suitable acid or salt. The proportion of solids to the volume of the whole sample is a measure of the concentration. Second, a calculation is made of the required amount of soluble oil, compound, or water necessary to add to the emulsion to restore the original recommended concentration.

In any modern plant some arrangement is made for lubricant drum stock storage. This may consist of an oil warehouse near tank storage and distribution of other oils, or it may consist of an oil and grease crib in the plant itself. The essential requirement in any such stock handling is a clean, orderly arrangement based upon an understanding of the physical limitations of the stock. No one, for example, would place a carton of butter on a hot steam radiator and expect it to be usable long afterward. Yet, compounds containing soap and fatty oils are just as sensitive to high temperature. Such products should never be stored near steam pipes or any other heat source. Heat dries out the moisture of the composition and deteriorates fatty oils in compounds.

Drum stock should always be stored indoors or under cover. In outdoor storage, drums rust and deteriorate; stock is more subject to contamination from dirt and especially water; products such as soluble oils and drawing compounds (containing water) may freeze and de-

teriorate; and hot summer sun may melt and damage some greases and compounds.

If outdoor drum storage must be used, drums should be laid on their sides on raised wooden runners or planks and covered with tarpaulins. If drums must be stored outdoors on end and no cover is available, they should be tilted by setting one edge on a plank and being sure the two bungs are not only tight and sealed but in a horizontal line half way up the sloping face of the head. This position will minimize entry of standing rain water.

In cutting oil systems, metal chips are often extracted to recover cutting oil that is subsequently reclaimed and reused. Oil laden chips are first heated to increase the fluidity of adhering oil. This oil drains from the chips into a catch tank. The chips are then centrifuged to recover the remaining oil. This oil is then allowed to settle out solid particles, after which it may be either filtered or centrifuged to further clean it. It is then mixed with new oil.

Soluble oil emulsions or coolants are not generally reclaimed. However, such emulsions, in grinding service particularly, are run through strainers and settling tanks to remove fine chips and abrasive grits that would otherwise be recirculated to the work and cause scratches on the finished surface. Centrifuging and mechanical filtration of emulsions may also serve the same purpose.

Centrifuging will remove suspended solids, water and sludge. It may also separate some types of emulsions, but will not remove oil soluble contaminants. The Sharples and De Laval are the most commonly used machines. The De Laval unit is shown in fig. 6.

Magnetic separation of particles and chips of ferrous metals is sometimes employed. Obviously this means of keeping oil clean is limited in that it has no effect on nonferrous particles. It is used in conjunction with other filtering and recovery methods.

Filtration, employing various filtering media such as cotton, paper, fine mesh metal, felt or clay, is commonly used. Filters will remove solids and most sludge. Some will also remove water and moisture (blotter paper type) as well as very fine particles. Such filters, as well as those using cotton, felt, cellulose, etc., are of the absorbent type. In addition to the filtration advantages mentioned, they usually are low in cost and have high sludge holding capacity.

The other two general types of filters used are the mechanical and the adsorbent types. The former acts as a strainer to remove solids and oil insolubles. Layers of metal strip around a cylindrical core, metal disks pressed together, and stacks of paper disks are typical constructional features of such mechanical edge-type filters. Most edge-type filters have low sludge holding capacity, although one manufacturer incorporates a self-cleaning feature.

Adsorbent type filters, using fuller's earth or some other mineral adsorbent as the filter medium, remove not only suspended solids but also oil soluble oxidation products, resins, and acids. Such filters used in conjunction with oil heating

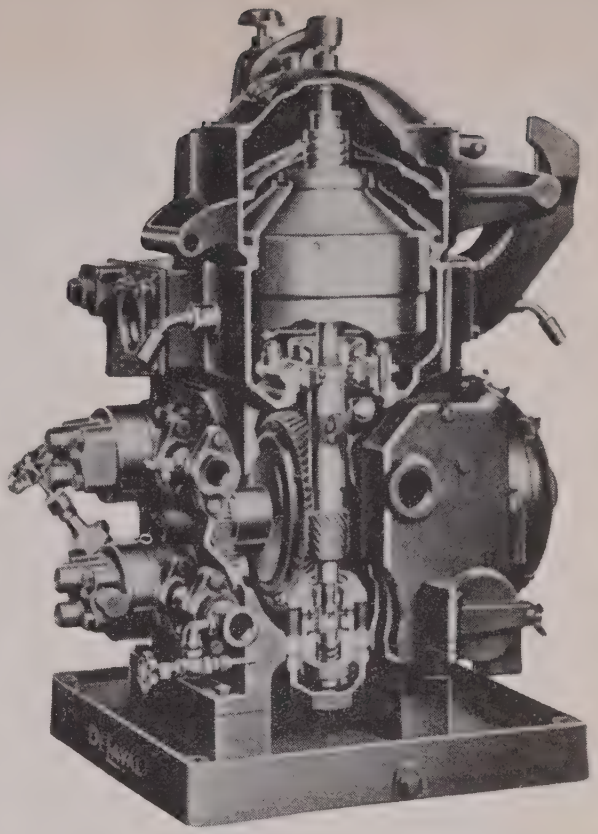


FIG. 6—Centrifuging will remove suspended solids, water and sludge so that the cutting oil can be reclaimed. Sharples and De Laval centrifuges are the most commonly used, the De Laval unit being shown here.

elements to reclaim oil are efficient. However, adsorbent filters may also remove desirable additives from additive type oils. Therefore, in selecting a filter or filtering system, care must be used to take into account the design of the machine, the construction of the oil system, and whether straight mineral or additive-type oils are used. The latter point is extremely important to filter selection.

In cutting oils, where some additive depletion is encountered through service and filter methods, it may be desired to add to the reclaimed oil a new replenishing oil that contains more compounding than the machining job itself requires. The blend of reclaimed and new replenishing oil will then be more than suitable for reuse as cutting oil.

For many machining jobs, the cutting oil used may have a considerable margin of operating safety because of its formulation. Thus, it can afford some additive depletion and still be right for the job when blended with original new oil.

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An Analysis of Nitriding

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IT has now been several decades since early investigators reported research work which dealt with the reaction of steel with nitrogen at elevated temperatures. It has only been approximately 20 years, however, that the reaction has been employed as a practical method for imparting certain properties to steel parts.

This process, which has long been termed nitriding, consists of subjecting machined and preferably heat-treated parts to a nitrogenous medium, usually ammonia gas, under conditions of elevated temperature whereby a high degree of hardness is imparted to the surface layers without the necessity of further heat treatment. Wear resistance, retention of hardness at elevated temperatures and resistance to certain types of corrosion are other properties imparted to steel parts by the process.

Since most engineers involved in the process-

LEFT
FIG. 1—Section of Nitralloy G modified (type 1) after nitriding 30 hr. 350X.

RIGHT
FIG. 2 — Photomicrograph of a cross-section of commercial A-4140 steel (type 2) after 30-hr nitriding. 350X.

Improvements in processing techniques and equipment have extended significantly the applicability of the nitriding process to industrial surface hardening uses. Evaluating the status of nitriding as a competitive method, the author explores the subject in detail and discusses its advantages and limitations. Surface hardness data, comparing various commercial steels with specific nitriding grades, are reported in this first part of a two-part article, correlated with structural studies and a discussion of the metallurgical factors involved.

ing of steel are at least basically familiar with the nitriding process, as well as some of its advantages and limitations, the author will not attempt to more than briefly review the process. The primary intention of this article is to report and discuss more recent results which have been obtained in the study of nitriding and the present day possibilities of the process in the metallurgical engineering field.

It is readily granted that since nitriding is carried on at somewhat elevated temperatures it may rightfully be termed a method of heat treatment. Most individuals who have been directly involved with nitriding work and other heat treating processes, however, have come to regard nitriding as being entirely apart from other methods of heat treatment. There are two reasons for this line of thought: (1) The operation is carried on at subcritical temperatures so that no phase changes are effected during the heating period, and (2) the case which forms from the reaction of nitrogen with the component elements of the steel is inherently hard and is not dependent on cooling rates for formation of the hard structure.

When the nitriding process was originally introduced as a method for surface hardening steel it was probably not intended that it should become directly competitive with other means of surface hardening such as cyaniding and carburizing. It was primarily intended to fulfill new and increased engineering requirements due to the characteristics possessed by the nitrided case and to offer a simpler method of producing distortion-free parts relatively free from unbalanced residual stresses. The latter reason became particularly attractive to metallurgists and others involved in the processing of steel parts, since

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FIG. 3 — Specimen of a straight carbon, shallow-hardening tool steel (type 3) after nitriding 30 hr at 950F.

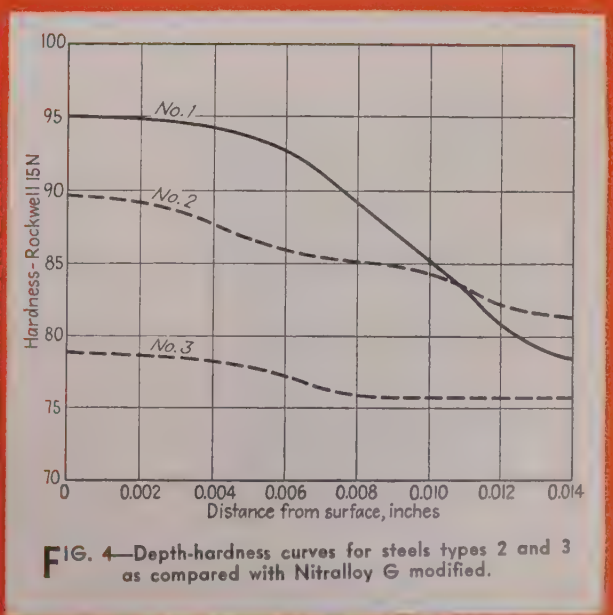

FIG. 4—Depth-hardness curves for steels types 2 and 3 as compared with Nitralloy G modified.

TABLE I

Compositions of Steels Studied for Nitriding Characteristics

Steel No.	Element, Pct							
	C	Mn	S	Si	Ni	Cr	Mo	Al
1	0.43	0.60	0.020	0.25	.....	1.60	0.40	1.20
2	0.41	0.78	0.022	0.23	.....	0.95	0.22	.....
3	1.05	0.29	0.018	0.20	.....	.....	.....	.....
4	1.08	0.46	0.015	0.60	.....	17.00	0.54	.....
5	1.03	0.35	0.020	0.22	.....	1.45	.....	.....
6	0.38	0.90	0.020	0.54	.....	13.10	.....	.....
7	0.14	1.00	0.090	0.64		13.20	0.40	.....
8	0.14	0.55	0.020	0.25	3.46	1.62	.....	.....
9	0.36	1.55	0.100	.....	.....	.....	.....	.....
10	0.18	1.46	0.110	.....	.....	.....	.....	.....
11	0.12	0.95	0.300	.....	.....	.....	.....	.....

distortion and cracking of parts in heat treatment has always presented major problems.

The cost of nitriding has usually been the primary factor in retarding its popularity. However, the increased demands of World War II not only further confirmed the value of the nitriding process, but brought forth many new applications for which nitriding proved advantageous. It is only logical that as the demand for a process increases, continued development by a greater number of investigators will simplify the methods and extend its use to a wider range of materials, thus reducing the cost.

It should be stated at this point that it is not in any way the intention of the author to infer that nitriding has now become generally competitive with other methods of surface hardening. It has, however, been proved that the general cost of nitriding has been reduced and that it has become competitive with other surface hardening methods for many specific applications when all factors are taken into consideration. In particular, progress has been made in applying the process to materials other than those originally recommended.

After Fry established the iron-nitrogen equilibrium diagram, the extent to which various elements combined with nitrogen when exposed to ammonia gas at the proper temperature was determined. Fry reported that aluminum ranked first not only in the amount of nitrogen with which it would combine, but that the aluminum nitride ranked highest in resistance to decomposition at elevated temperatures. Fry also reported that chromium, vanadium, titanium, tungsten, molybdenum and manganese are other elements which form nitrides with high nitrogen contents.[1] As result of this investigation and subsequent research by other investigators, a series of nitriding steels was developed which contained appreciable percentages of aluminum, usually 0.75 to 1.50 pct.

In order to meet various physical property requirements of case and core, carbon and other elements varied over an appreciable range. Chromium and molybdenum, in most cases, were employed as the principal alloying elements in addition to the aluminum and carbon. Some of these steels also employed nickel as an alloying element, but this was done to obtain special core properties which will be discussed later. The composition of one of these steels, commonly known as Nitralloy G modified, gained much popularity as a nitriding steel during the last war and is shown in table I identified as steel 1. Unquestionably this particular steel is and has been one of the best for use in conjunction with the nitriding process, at least for general purposes.[2] This steel when correctly processed will show consistent surface hardness values of 94 to 95 R15N (Vickers 1100 to 1400). It is also possible to retain core hardness values up to 350 Bhn if desirable. Table I also shows the composition of ten additional types of steel which have been studied as to nitriding properties. From some of the compositions it would be illogical to expect desirable results on nitriding, since the steels contain only small percentages of the elements mentioned which are known to combine readily with nitrogen. Results with these steels will be reported, however, as a matter of academic interest and to prove the necessity for certain alloying elements.

[1] *A Fry, "Theory and Practices of Nitrogen Case Hardening," J. British Iron & Steel Institute, Vol. 125, No. 1 (1932).*

[2] *V. O. Homerberg, "Nitralloy and the Nitriding Process," Nitralloy Corp., New York.*

TABLE II

Hardness Values of the Tested Steels after Heat Treatment and Nitriding.

Steel No.	Preliminary Heat Treatment	Hardness after Heat Treatment, Rc	Hardness after Nitriding, R 15N
1	Oil quenched from 1750°F; tempered 1150°F	38	95
2	Oil quenched from 1550°F; tempered 1000°F	39	89.5
3	Water quenched from 1450° F; tempered 1000°F	32	78
4	Air quenched from 1950°F; tempered 1000°F	52	92.5
5	Oil quenched from 1550°F; tempered 1000°F	41	88
6	Oil quenched from 1850°F; tempered 1000°F	41	95
7	Oil quenched from 1850°F; tempered 1000°F	37	94
8	Oil quenched from 1800°F; tempered 1000°F	28	91
9	Oil quenched from 1600°F; tempered 1000°F	25	82
10	Oil quenched from 1625°F; tempered 1000°F	12	78
11	Water quenched from 1625° F; tempered 1000°F	0	72

All steels, irrespective of composition, are better adapted to nitriding when in the quenched and tempered condition rather than in the annealed condition. While it is possible to nitride steels which are fully annealed, the results are less desirable for two main reasons: (1) Since the nitrided case is always extremely hard and brittle, it is desirable to have a tough and strong core which is comparatively resistant to deformation and provides a proper backing for the case. (2) The somewhat segregated microstructure common to steels in the annealed state results in a nitrided case structure which is also segregated and consequently is more susceptible to spalling and chipping even though hardness values measured by penetration tests may be equally as high as those obtained by nitriding the heat treated steels.

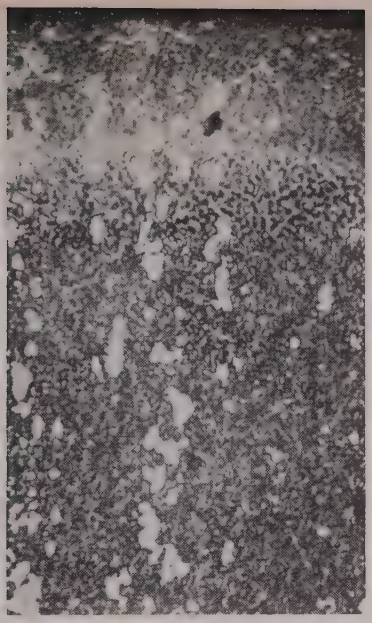

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FIG. 5—High carbon martensitic type of stainless steel, 440-C (type 4), after nitriding 30 hr. 350X.

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RIGHT

FIG. 6—Ball bearing steel, E-52100 (type 5), nitrided for 30 hr. 350X.

Therefore, all the steels for which nitriding results are given in this article were nitrided in the heat treated condition; table II shows the heat treatment which was applied to each of the eleven types of steel prior to nitriding. It will be observed from the table that each steel was austenitized and quenched so as to effect as nearly as possible a fully martensitic structure. All data given in the following paragraphs and illustrations for these eleven different steels are based on test specimens of ¾-in. diam and ½-in. thickness. It will likewise to observed that in nearly all cases a tempering temperature of 1000°F was employed following the quench. This tempering temperature may be varied over a range of about 1000° to 1300°F depending upon the core properties desired. Since nitriding operations are carried on at a temperature of 950°

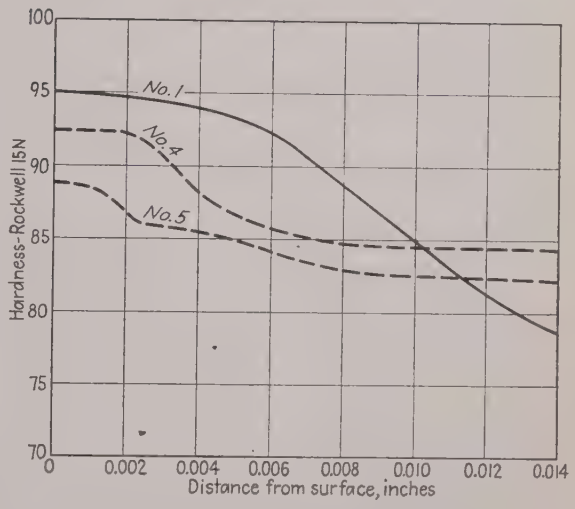

FIG. 7—Depth-hardness values for steels types 4 and 5 as compared with Nitralloy G modified.

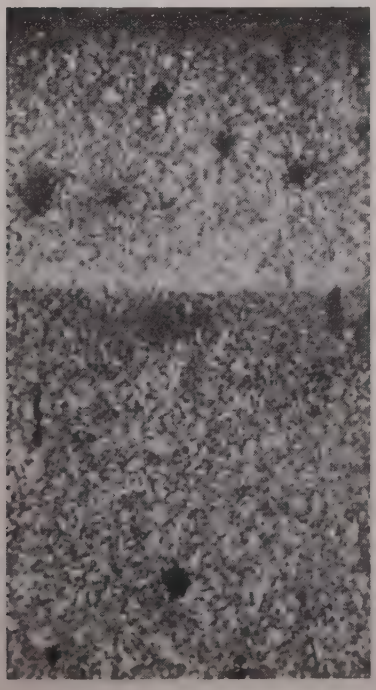

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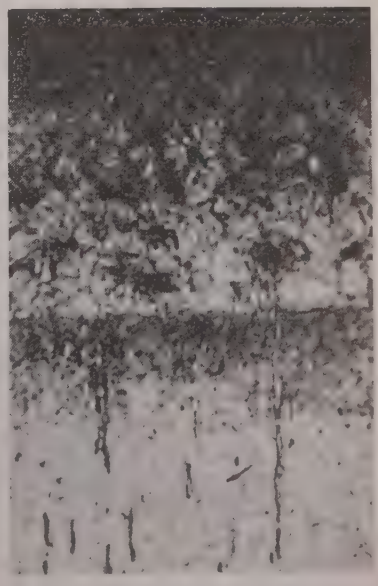
FIG. 8—Cutlery type stainless steel (type 6) after 30-hr nitriding. 350X.

o o o

RIGHT

FIG. 9—Free-machining, low carbon, straight chromium stainless (type 7) after nitriding for 30 hr. 350X.



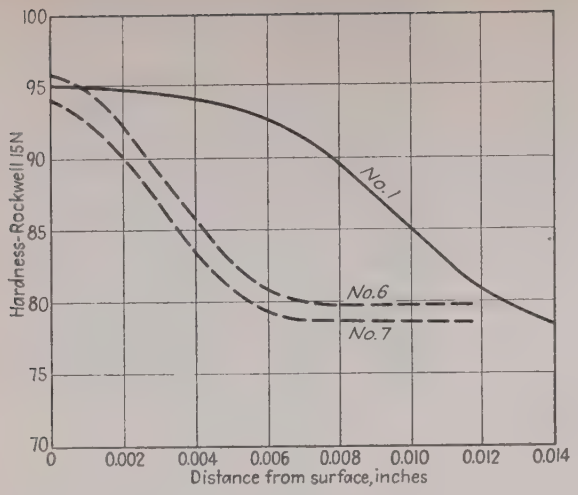


FIG. 10—Depth-hardness values for steels types 6 and 7 as compared with Nitralloy G modified.

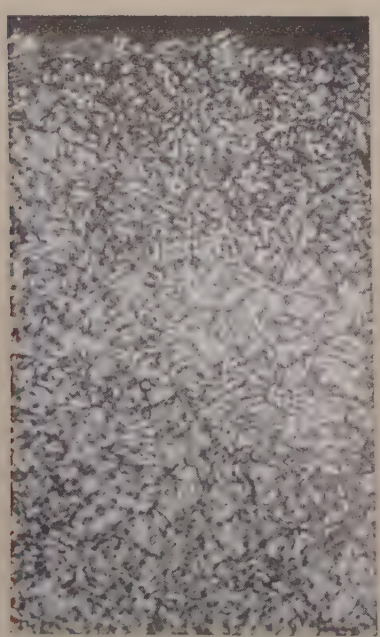
to 1000°F, the tempering temperature following the austenitizing and tempering operations must be equal to or higher than the temperature employed for nitriding. As to the selection of a tempering temperature within the 1000° to 1300°F range for any steel to be subsequently nitrided, this becomes a matter of the desired core hardness and the type and amount of machining operations between the heat treating and nitriding operations.

There is no apparent difference in the properties possessed by the nitrided case for tempering anywhere within the 1000° to 1300°F range. From the Rockwell C values shown in table II it is seen that for most of these steels it would be necessary to employ a somewhat higher tempering temperature to allow machining operations to be performed economically.

The column furthest to the right of table II shows the surface hardness as measured by the Rockwell 15N after nitriding at 960°F for 30 hr with an ammonia dissociation of 25 to 30 pct. It should also be mentioned that, irrespective of the fact that some of the Rockwell 15N readings indicate quite low hardness values, all eleven types were file-hard.

The case characteristic of each type are more clearly revealed by a study of the photomicrographs and depth-hardness curves. Fig. 1 shows a photomicrograph of a cross section of type 1 steel, which is Nitralloy G modified. The edge of the case is shown near the top of the picture and the structure is typical of nitrided Nitralloy. The gradual transition from the case to the core, which is the hardened and tempered structure, is shown near the bottom of the picture. The white area near the top right of fig. 1 is what is commonly termed white layer. This constituent is concentrated nitride which builds up on the surface under certain conditions. Methods of keeping this condition at a minimum will be discussed later.

Fig. 2 shows a photomicrograph taken of a cross-section from type 2 steel (commercial A-4140) which was nitrided under conditions identical to those for type 1. No white layer is evident at the surface, shown near the top of the photomicrograph. The difference in composition of types 1 and 2 effects a noticeable change in the appearance of the case. It should also be mentioned that approximately 0.030 in. of stock was removed from the nitrided surfaces of all test specimens after the preliminary heat treatment, but prior to nitriding, in order to insure that there was no decarburization or other sur-



LEFT

FIG. 11 — High quality carburizing steel, E-3316 (type 8), after 30-hr nitriding. 350X.

o o o

RIGHT

FIG. 12 — A medium carbon resulfurized steel (type 9), nitrided for 30 hr. 350X.

face conditions which might influence the results in the nitriding operation.

Fig. 3 is a photomicrograph of a cross-section from type 3 steel—a straight carbon, shallow-hardening tool steel. Results obtained from nitriding are shown merely for academic interest and to illustrate the necessity for alloying elements. The white border near the top of the picture shows the heavy layer of concentrated nitride which is about the extent of results obtained from nitriding this type of steel. This layer is file-hard and appreciably corrosion resistant, but extremely brittle, so that this type of steel in the nitrided condition would probably never have any commercial value.

Results shown by the photomicrographs in figs. 1, 2 and 3 are borne out by the depth-hardness curves in fig. 4. The uppermost curve is typical for results obtained in nitriding type 1 steel for a 30-hr cycle. The center curve shows that type 2 does not possess a case which is initially as hard as Nitralloy, but the gradual drop of the curve with stock removal does prove that the case has diffused with the core. The curve for type 3 steel shows relatively little effect from nitriding when measured by the penetration test.

Photomicrographs in figs. 5 and 6 are of nitrided samples of types 4 and 5, respectively, where type 4 is a high carbon martensitic type of stainless steel (440C) and type 5 is E-52100. The upper portion of fig. 5 shows the edge of the cross-section and a well-defined nitrided case apparently free from white layer, though the line of demarkation, down about one-fourth the distance from the top of the micrograph, is extremely marked. This apparently is quite typical

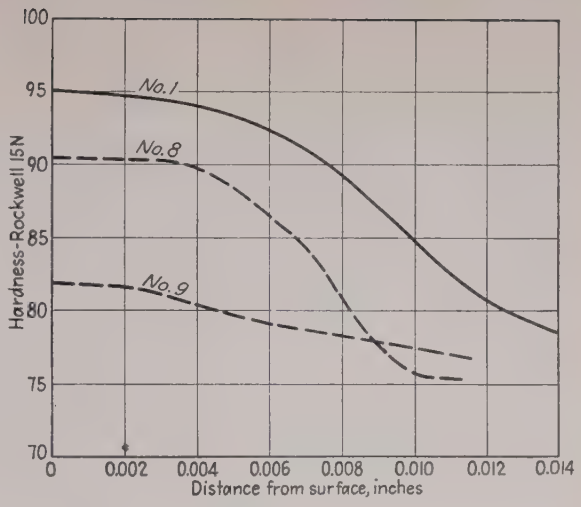
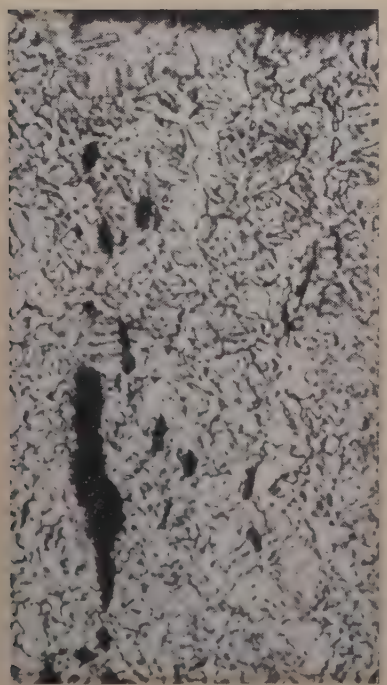


FIG. 13—Depth-hardness curves for the nitrided steel types 8 and 9 compared with Nitralloy G modified.

of results in nitriding the high alloy steels. The white areas in this photomicrograph are free complex carbides which were not dissolved in the preliminary heat treating operation.

The microstructure shown near the top of fig. 6 shows that some case has been effected, but far less in concentration than that in fig. 5.

Fig. 7 shows the results of depth-hardness examinations performed on steels 4 and 5, compared with type 1. The sharp line of demarkation shown by the photomicrograph of type 4 is also evident in the center curve of fig. 7. It is interesting to compare the results shown by the depth-hardness curves and the photomicrographs



LEFT

FIG. 14—Resulfurized openhearth steel, C-1118 (type 10), after 30-hr nitriding. 350X.

° ° °

RIGHT

FIG. 15 — B-1113, bessemer screw stock (type 11), nitrided for 30 hr. 350X.

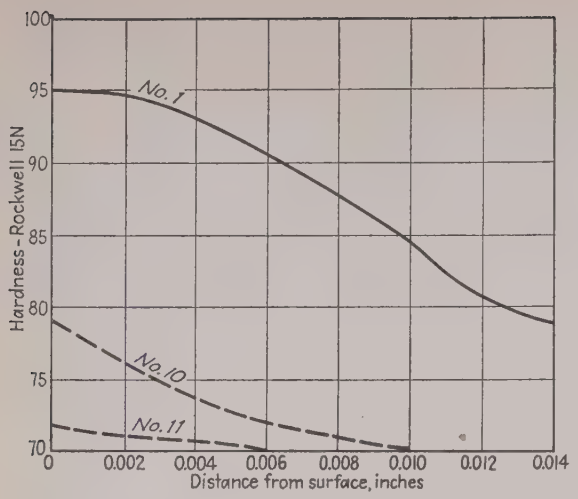


FIG. 16—Depth-hardness values for types 10 and 11 in comparison with Nitralloy G modified.

as well for types 3 and 5. These two steels are almost identical in composition except for the chromium addition in type 5.

Figs. 8 and 9 are photomicrographs of specimen cross-sections from steels 6 and 7. The composition for type 6 shows a typical cutlery type stainless steel (type 420), while type 7 is the free-machining, low carbon, straight chromium stainless commonly known as type 416. Both types show extremely sharp lines of demarkation between case and core. The black spots appearing throughout both photomicrographs are pits resulting from electrolytic etching. The sulfide stringers common to free-cutting steels are also apparent in fig. 9. Depth-hardness curves for these two steels are shown in comparison to type 1 in fig. 10. Extremely high surface hardness values are shown for both of these steels though from lack of case diffusion in the core the hardness decrease is rapid as stock is removed from the surface.

Figs. 11 and 12 show photomicrographs of sections from types 8 and 9 after the same nitriding treatment. Edges of the cases are seen near the tops of the pictures. Type 8 steel is commercially known as E-3316 and is one of the oldest and highest quality carburizing steels. The composition of type 9 places it in the class of commercial C-1137, which is a medium carbon resulfurized steel that was primarily developed for processing in automatic screw machines. The sample in fig. 11 shows a well-diffused case apparently free from nitride concentration. Effect of the nitrogen is obviously lessened in the case of the steel in fig. 12, and some white layer is apparent.

Depth-hardness curves shown in fig. 13 again bear out results of the photomicrographs. Type 8 steel, even though it is not initially as hard as type 1, retains the hardness for a greater depth than others which have been discussed. As might be expected, type 9 shows low results on the depth-hardness curve. In all probability the amount of reaction it did show may be attributed to its relatively high manganese content.

The photomicrographs in figs. 14 and 15 show sections from specimens of types 10 and 11. Type 10 is a resulfurized openhearth steel commercially known as C-1118, while type 11 is B-1113, ordinarily known as bessemer screw stock.

Results from nitriding these two steels are shown only for academic interest.

Edges of the specimens in the upper parts of the pictures show little or no case. Since both specimens exhibited file hardness after nitriding, it is probable that there was a buildup of white layer which may have been lost in specimen preparation. The depth-hardness curves for these two steels, fig. 16, also show very low results in comparison to type 1.

In the second and final part of this article, to appear in a subsequent issue, the author discusses other steels, including austenitic stainless, which can be nitrided advantageously and analyzes the cost factors and other considerations involved in nitriding.

High Temperature Microscopy

A VACUUM furnace, constructed to enable metal specimens to be kept under microscopic examination while at temperatures up to 1740°F, prevents oxidation of the steel specimens and of the molybdenum heater, during operation. The equipment, described in the Journal of the Iron and Steel Institute, December 1948, incorporates a mica observation window and gaskets of heat-resistant silicone rubber.

The furnace is waxed directly onto the steel flange of an oil-diffusion pump, which backed by a rotary pump, evacuates it when running. The lower part of the furnace body is double-walled, and accommodates cooling water in the annular space, while the upper part consists of a solid brass ring to which the cover is attached. The furnace cover is in two parts; one part has a recess for a gasket on which rests the observation window, and the other part rests on the window, is water-cooled, and has ports through which air is blown to cool the objective.

Modifications are being made to the apparatus to adapt it to 35 mm film in order to obtain continuous records of transformations in steels. Also, it is anticipated that the use of a reflecting microscope will enable much greater magnification to be obtained without reducing the distance between the specimen and the objective.

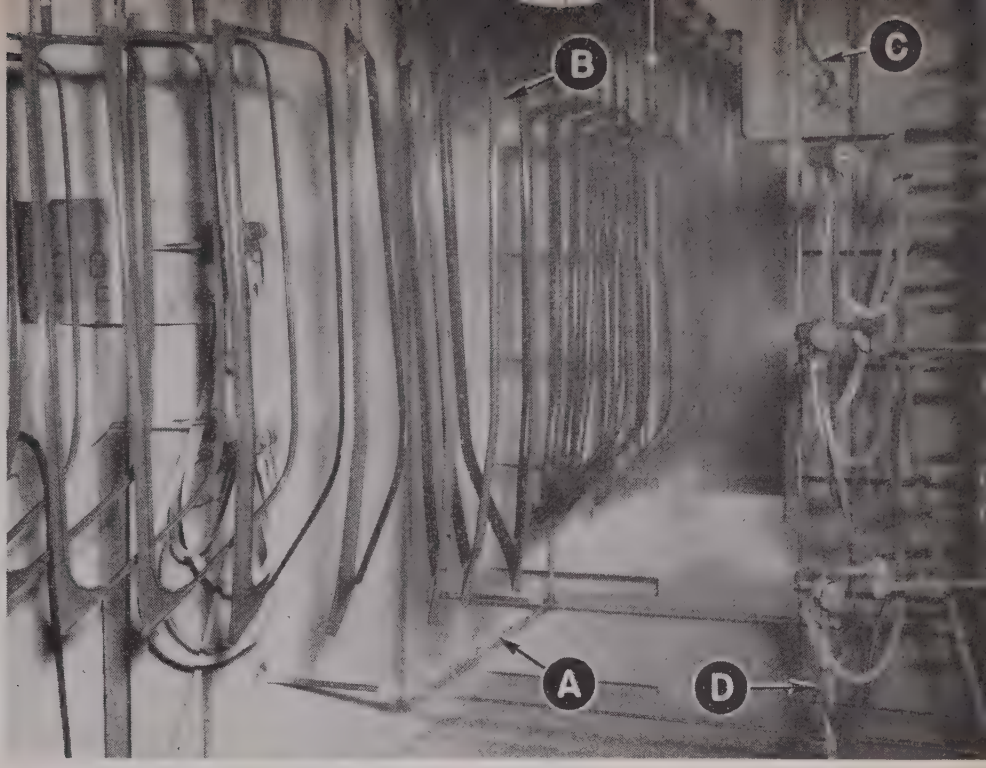


FIG. 1 — Moldings receiving the ground coat of enamel by electrostatic spray. The electrostatic field is provided by an electrode system of fine wires, charged to a 130,000-v potential, running from rods A to B and from C to D.

Enameling Auto Window Moldings By Electrostatic Spray

Savings between 50 and 60 pct in enameling and lacquering auto window garnish moldings have been effected at the Jamestown Metal Corp. through the installation of an electrostatic spray unit. Fed by an overhead monorail conveyer, an electrostatic spray booth, described in this article, handles the same output as four ordinary hand-spray stations, 22 pieces per min, with electrostatic deposition giving excellent coverage on the edges and in the contours of the moldings.

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Associate Editor,
THE IRON AGE

FINISHING automobile window garnish moldings by hand spray is a headache because of the contours involved. At Jamestown Metal Corp., Jamestown, N. Y., the installation of an electrostatic spray process,[1] supplied by Ransburg Electro-Coating Corp., Indianapolis, has largely overcome this problem. The electrostatic booth used in applying the ground coat of enamel and the lacquer finish has replaced four hand-spraying stations and has cut the cost of the finish from 50 to 60 pct.

Moldings are fed to the booth by a grounded overhead monorail conveyer. In the coating zone an electrostatic field is created between the pieces and an adjacent electrode system, fig. 1, charged to a 130,000-v potential. The enamel or lacquer, depending on which is being applied, is sprayed into the field toward the moldings. The coating material particles pick up the negative charge of the electrodes, the opposite of the polarity of the work, and as a result are attracted to the moldings and deposited on the surface.

The attraction is sufficiently great to cause the atomized coating particles to change direc-

LEFT

FIG. 2 — Window garnish moldings are polished and buffed prior to being clipped to the finishing line.

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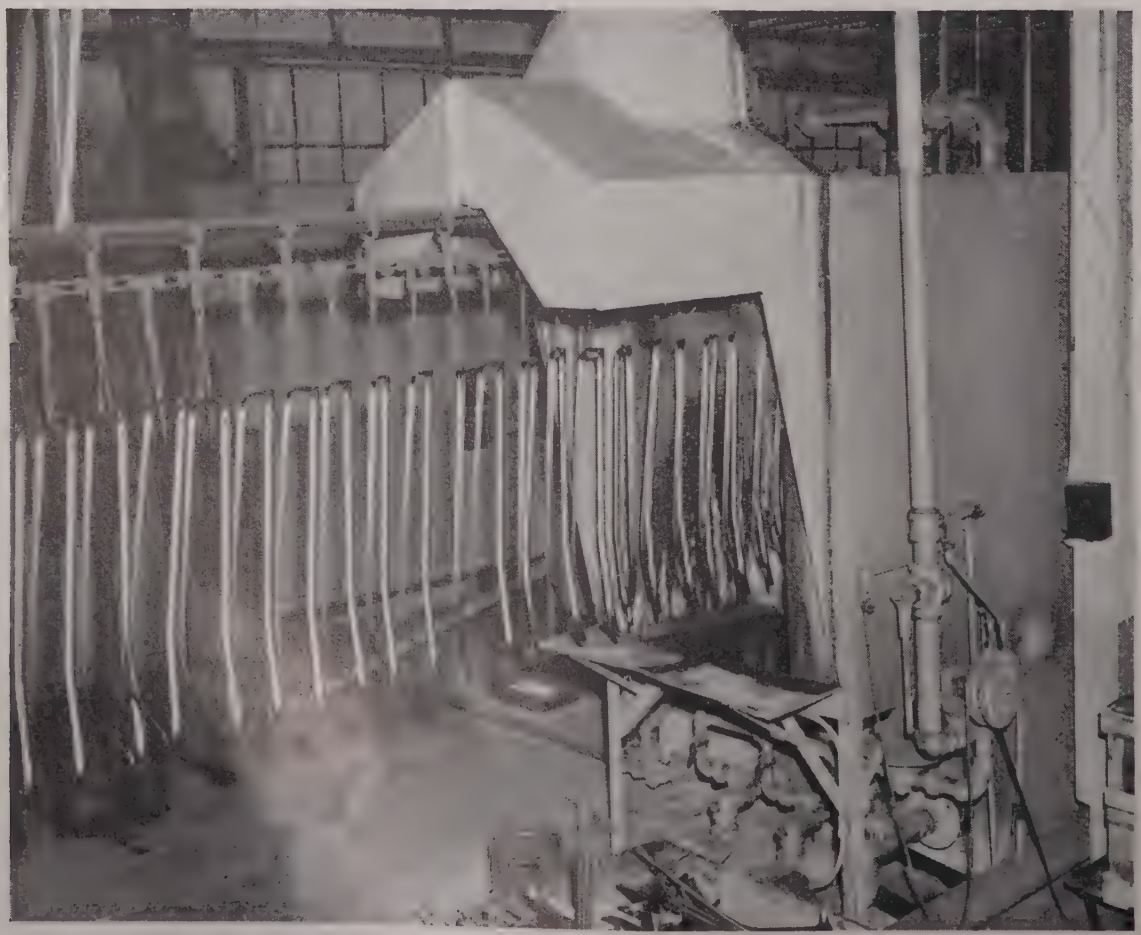
BELOW

FIG. 3 — Moldings entering U-shaped tunnel to be sprayed with an alkaline cleaner, given a water rinse and dried by hot air blast before receiving the ground coat of enamel.



tion and, in effect, wrap around the work to cover edges and contours. Very little sprayed material escapes beyond the electrode system, the reduction in overspray accounting for a 50 pct saving in paint.

Electrical requirements for the booth are supplied through a voltage pack containing two separate transformers; one handles the high voltage for the electrode system and the other supplies heating power to the filament of a rectifying tube by means of which the transformed high voltage is rectified to dc, half wave rectified. The entire pack is immersed in oil and contained in a 3-ft cube tank. It operates from a 220-v, ac line and draws 1000 w.

[1] *Additional information on electrostatic spraying is given in "Electrostatic Spraying and Detearing,"* THE IRON AGE, *Oct.* 19, 1944.—*Ed.*

In the overall process at Jamestown, the moldings are polished and buffed, as in fig. 2, and are attached by clips to an endless overhead monorail conveyer. From the loading station, the conveyer takes the moldings through a U-shaped spray tunnel, shown in fig. 3, in which the work is sprayed with a steaming hot alkaline cleaner, given a clean water rinse and dried by circulated hot air.

On leaving the tunnel, the pieces are conveyed to the electrostatic spray booth, fig. 1, where the ground coat of enamel is applied. Next in the line is a U-shaped baking tunnel where the enamel is dried for 12 min at 350° F. From this tunnel the moldings are carried to the process graining stations, removed from the conveyer, given the darker grain-finish and returned to the conveyer to be passed through a baking tunnel which dries the grain finish at 350° F for 9 min.

The final operation is the application of the finish lacquer, again by electrostatic spray. From this booth the conveyer takes the moldings to the unloading and packing department. The lacquer dries en route and pieces can be packed as they are removed from the line or can be racked for later handling.

The conveyer system returns to the loading station to receive new work. Clip attachments on the conveyer are 6 in. apart. Moving at 11 ft per min, the standard speed throughout the line at Jamestown, 22 pieces per min are finished. The clips, by which the moldings hook onto the line, are cleaned about once a month in paint remover.

Ceramic Turbine Blades

IN an investigation of the feasibility of using ceramic materials for highly stressed turbine components, the National Bureau of Standards has developed body 4811, a more promising ceramic than sillimanite. Utilizing 58 body 4811 blades, a gas turbine was built and tested.

Both spin tests and hot-gas tests were made. A set of sillimanite blades was spin-tested to a tip speed of 737 fps without the appearance of blade-fracturing stresses. These blades were also operated hot at a turbine-inlet gas temperature of 1400°F and a tip speed of 489 fps for 30 min without adverse effects from stress concentrations at the blade-supporting shoulders. All sets of body 4811 blades were successfully spin-tested to a tip speed of 737 fps and were run hot for periods of varying length at high tip speeds. One set of blades was successfully operated for 50 hr at various tip speeds to 737 fps and at a turbine-inlet gas temperature of 1800°F.

The investigation, reported in NACA Research Memorandum No. E8G20, has also shown that body 4811 blades are capable of withstanding a considerable decreasing-temperature heat shock while centrifugally stressed; however, they will not endure a complete heat shock of such magnitude as that caused by loss of the air supply to the turbine while centrifugally stressed.

Army Electrical and Electronic Developments

TWO inventions making possible stable voltage control under wide variations of dc leads are among the electrical and electronic developments of the Army Department described in a group of reports recently released by the Office of Technical Services, Dept. of Commerce, Washington.

A moisture-proofing compound for radio crystal holders which has been found to result in as much as a 700 pct increase in crystal life is another development reported.

Also of particular interest are connectors for electrical circuits that have improved shock and vibration resistance qualities; a special antenna for transferring energy between coaxial cables and wave guides; highspeed keying devices for remote control electronic systems; and dry cell batteries which, through the use of diatomaceous earth or similar minerals as electrolyte absorbents have extended operating lives.

Oldsmobile Uses Modern Gaging Techniques In Producing New Engine

• • •

At the new Oldsmobile plant, where the 1949 Rocket engine is being manufactured, a variety of modern gaging techniques are used to assure the accuracy of parts used in the engine. With emphasis placed on automaticity to minimize the human error, the gages are engineered into assembly lines and keep pace with other production operations.

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By HERBERT CHASE
New York

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GAGING and inspection methods in use at the new engine plant of Oldsmobile incorporate some of the most recent developments in gaging technique. When the production line for the new 1949 Rocket engine was set up, gaging methods had to be as modern, accurate and efficient as the production methods. A primary objective was to reduce the number of manual gaging operations and to maintain or improve the degree of precision over that held in making earlier engines. This required reducing gaging time, which has been done largely by providing equipment that is either semi-automatic or faster and easier to handle.

After final honing of cylinder bores, the cylinder block reaches an air gage station shown in fig. 1. When the block is located in the fixture, plungers set at 45° enter each cylinder bore of one bank of the V-8 block. Each plunger has air nozzles spaced to gage the diameter at four positions in each bore. Opposite the scales on the front of the machine are corresponding bobs in glass tubes which indicate the diameters gaged. The bobs must rest between the limits marked on the scales, or the bore is outside the tolerance limits. Plungers are then turned radially 90° by a crank and the bob positions again observed. Where significant changes occur, the cylinder is out of round by the amount of the change; but all bobs must be within limits at both plunger positions.

The operator observes the bob position for one gaging point on each cylinder and turns the dials on corresponding hinged hammers, which, when dropped, mark the corresponding bore size on a face adjacent to the respective bores. When bores on one bank of the block are gaged, the plungers are withdrawn, the block is swung around 180° on the supporting table, and the gaging and marking operations are repeated.

At a subsequent station along this line, a

record of the eight bore sizes of each block is teletyped to an assembly point where an operator selects a set of pistons to fit each bore and places them in a tray along with mating piston pins and rods. Later, this numbered tray of parts meets the cylinder block of the same number at an assembly station. Hence, the assembler has at hand a properly sized piston, pin and rod to put in place in each bore. Thus, selective assembly in correct sizes is assured.

Before blocks reach assembly, however, they pass through several air gaging stations of which one is shown in fig. 2. The block rests on the roller conveyer and the plugs that do the gaging are inserted by hand. These plugs are rigidly supported in a casting that holds them in precise alignment when checking the crankshaft, camshaft, and distributer-shaft holes. Each of two longer plugs has five pairs of air nozzles that set in each of five bearings when in gaging position.

This assembly is supported by a counterweighted cable and the plugs are easily inserted into the corresponding holes. Gage dials on the instrument panels show whether each hole is within diameter limits marked. Then each plug is turned 90° to check for concentricity that the pairs of nozzles, which are 180° apart, may indicate.

Before cylinder block castings are machined, they are checked in the qualifying fixture. After being clamped against locating pads provided for gaging purposes, four blocks having semi-cylindrical upper ends are raised to check clearances for the cutter used in the subsequent operation. If this were not done, the cutters employed in subsequent milling might foul the casting and perhaps injure the cutters or the machines. If clearance is adequate, however, the casting will be handled satisfactorily through following operations.

Air gaging of pistons is facilitated by the classifying gage in fig. 3 that checks skirt and pin hole diameter as each piston is placed in gaging position. Red lights flash if any dimension is outside specified limits and show which dimension is off size. The unusual feature of the setup, however, is that the gage automatically marks the skirt diameter and pin hole diameter of the piston on the piston head simultaneously switching on a light opposite the conveyer track on which pistons of this particular size are to be placed.

Thus, when the gaging is done, the operator places the piston in the track indicated by the light and the piston moves along to a station where trays of parts are made up for transfer to selective assembly points. The conveyer has eight tracks to accommodate pistons whose skirt diameter varies, by 0.00025-in. increments, from the maximum to minimum size limits permitted. As tracks are five tiers high, the conveyer can hold 10,000 pistons, all graded as to skirt diameter.

At the delivery end of the piston conveyer, fig. 4, is the operator who receives the teletype data on bore sizes of blocks moving toward assembly stations. The operator selects from the conveyer a piston to fit each bore and places these pistons on a track in correct sequence. Piston pins and

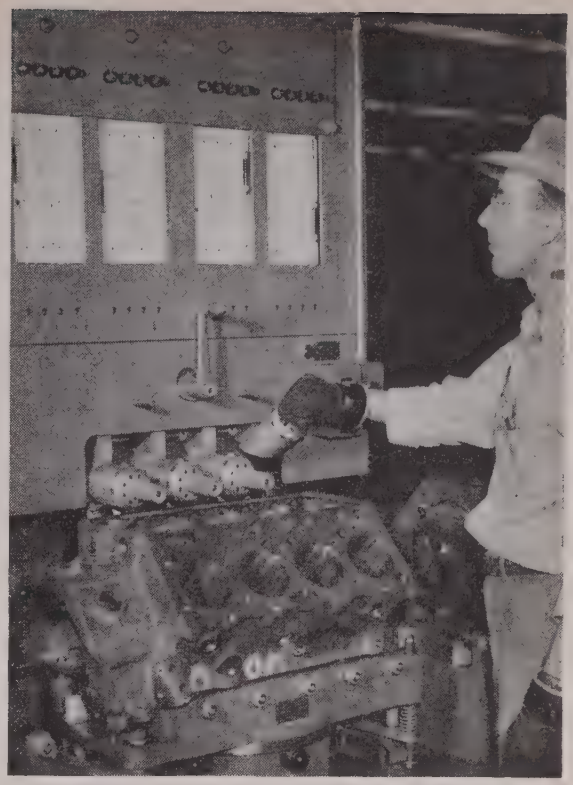


FIG. 1—Four cylinder bores are air gaged simultaneously at four points in this machine and hinged hammers mark bore diameter on flange. Out-of-roundness is also checked. Then the blocks are turned 180° and gaging is repeated on the other four cylinders.

rods, already gaged and graded for size, also reach the same station on their own conveyers. A pin that fits the piston hole and a rod that fits this pin is placed with each piston before trays of

FIG. 2—Air gaging the diameters of crankshaft main bearing holes, camshaft bearing holes and the distributer shaft hole is done by inserting gage plugs. Gage dials are in background.

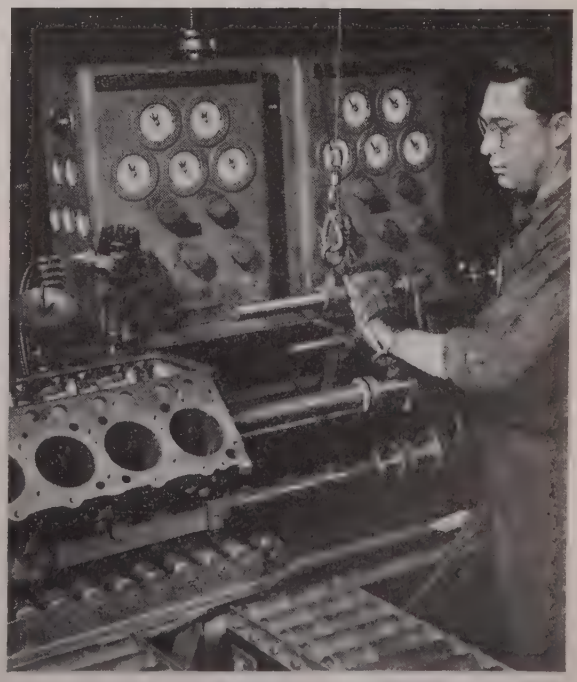


FIG. 3—These air gages check piston pin hole and other piston dimensions. Skirt and pin hole diameters are automatically stamped on the piston head and a light flashes to show in which track of the storage conveyer, right, the piston is to be placed.

eight sets are made up for delivery to the station where these parts are assembled in the corresponding block bores.

Piston rods, before they reach the station shown in fig. 4, pass through the station shown in fig. 5, where an air gage, left, checks each rod to insure parallelism of the axes of the bearing holes at each end. The rods are set over pins equipped with air jets and any lack-of-parallelism is indicated by bobs in corresponding tubes on the scale panel. The same operators check rods on a Shadowgraph machine, right in fig. 5, which weighs each end of the rod. Weight of each end must come between limits ± 2 grams before the rod is accepted, as correct weight is important to insure proper engine balance.

Many parts do not warrant semi-automatic or other air gaging equipment but still require the use of hand plug or snap gages to insure that

FIG. 4—At discharge end of conveyers for pistons, the pins and rods are arranged in mating sets and are placed in trays for transfer to points for selective assembly.

certain dimensions are within limits. In such cases, efforts are made to facilitate gaging by bringing the part into easy gaging position and by having the gages handy for rapid application.

Thus, there are setups, such as that shown in fig. 6, where cylinder heads receive final dimensional gaging. Heads roll along the conveyer into a position where they are lifted and clamped by hydraulic means between trunions, making it easy to turn the head so that any face is in handiest gaging position. A tray above the fixture holds the plug gages needed to check various hole sizes.

Plate Checks Spacing of Holes

For about each tenth head, the operator is required to apply to one face of the head the plate shown hanging in front of the inspection fixture, This plate checks the spacing of certain holes that must register with parts of mating elements. When heads pass the gaging at this station, they are ready for assembly to cylinder blocks except for checking clearance volume on the Cavitometer shown in fig. 7.

FIG. 6—Final dimensional inspection of cylinder heads is done in a hydraulically clamped trunioned fixture.

To use the Cavitometer, the cylinder head, bottom up and with all valves in place, is received on the roller conveyer and is pushed onto the bed of the machine that then elevates and clamps the head against a Neoprene gasket. At the same time, all four spark plug holes are sealed. In this position, each combustion chamber is below a cylinder at the upper end of which is a microphone. Below each microphone there is a closed space that includes the clearance volume to be measured. A fifth cylinder is set over a combustion chamber of known and fixed volume and is used for calibrating and checking purposes.

In principle, this machine is similar to a pipe organ in which pitch depends upon the volume of air passing through the pipe. If the volume is varied by changing the size of the pipe, pitch changes. Pitch then becomes an index of volume.

In the Cavitometer this principle is used. The microphone is a means of measuring pitch and consequently the volume. This is accomplished electronically by converting certain impulses into a reading on an electric meter having a scale that reads directly, in cubic centimeters, the volume measured.

Once started, the machine runs through an automatic cycle, a timing device giving a reading of the volume in each cylinder head cavity in succession. If not within the limits specified, the head is rejected. When readings indicate that any cavity has a volume above the maximum limit, the head has to be scrapped. If the volume is below the minimum limit, salvaging may be feasible by machining away some metal to increase the combustion chamber volume.

Among other unusual gaging setups is that in fig. 8 for checking crankcases where the bell housings of Hydromatic transmissions fit. Crankcases move along the roller conveyer in the background, and, for gaging, are locked hydraulically in position at the far end of the gaging fixture. The head of this fixture contains dials that indicate any eccentricity of the bell housing pilot hole in relation to the crankshaft axis and any lack of squareness of the rear face relative to this axis.

Besides undergoing dimensional gaging, some

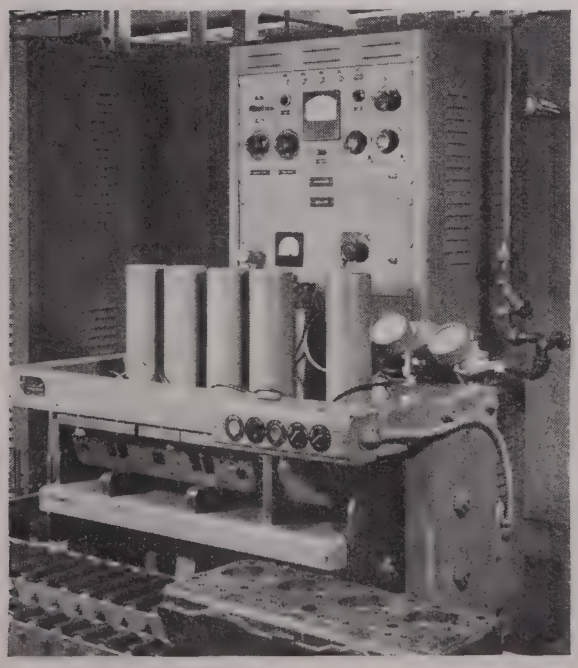


FIG. 7—This is the Cavitometer setup for checking the volume of each clearance space in cylinder heads. The machine goes through an automatic cycle in which clearance volume is measured within ±1 cc by pitch devices under electronic controls.

castings have to be checked against leakage. One such is the intake manifold whose angular flange faces fit against cylinder heads. For this test, castings are set in a machine with angle faces down against Neoprene gaskets. When the table lifts, the carburetor flang is sealed under a projecting head and air is admitted under pressure. If the pressure does not build up at a set rate, a leak is indicated and a solenoid operates automatically to stop the checking cycle. If castings are without leaks, three passages are automatically checked in succession.

FIG. 5—Air gage at left determines whether pin and big end holes in piston rods are within limits as to parallelism. At right, the weight of each end of the rod is checked by Shadowgraph.

Crankshafts receive a final dimensional check, in the machine shown in fig. 9, while resting in a self-aligning cradle. The cradle holds the shaft

FIG. 8—Crankcase bell housings are checked on this fixture for relation between the pilot hole for the transmission and the crankshaft hole and for squareness of rear face.

in such position that three pairs of gaging nozzles at each of the five main bearings measure, by bob positions in glass tubes, the bearing diameters. One pair is near each end and one at the center of each bearing. By turning the shaft by hand any out-of-roundness is indicated.

Each pin is tested in succession by use of the movable gage shown. It also has three pairs of nozzles that check diameter near each end and at the center of each pin. Width of the rear main bearing is also checked on a separate indicator operating with nozzles that are fixed. Bearing faces gaged are those that locate the shaft endwise when assembled in the main bearings.

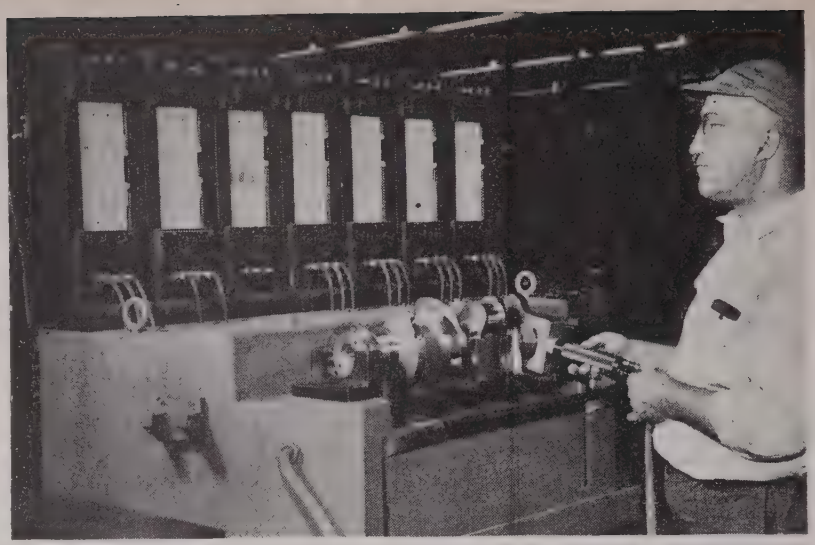


FIG. 9—Crankshafts are air gageg on a semi-automatic basis in this machine. All bearing and pin diameters are checked at three points and the length of the rear main bearing is also measured. These dimensions are held within ±0.001-in.

All dimensions gaged in the crankshaft machine are held between 0.001 in. limits. Where dimensions are toward the high side, a red mark is made and when toward the low side a yellow mark so indicates. These marks serve as a guide to assemblers who apply the mating bearings accordingly.

Camshaft checking is done in a similar air gaging machine having two gaging positions. In the first of these, toward the rear, the diameters of each of the five main journals are gaged as are also the thickness of the flange and the relationship between the contact face of the oil pump-distributer gear and the flange face. Bob position in tubes determine if these dimensions are within set limits.

In the second or forward position, any eccentricity of the oil pump-distributer gear relative to its bearing is checked by a dial indicator and air pressure is applied to make sure that oil passages in the shaft are all open. A check is also made by an air gage in this position to make sure that journal spacing comes within specified limits.

There are many other gaging operations, but most of these are either more or less conventional or else parallel to those described. Few require elaborate gaging machines, but all follow good gaging practice. Set-ups are designed to save time and still come as close to elimination of human errors as feasible.

. . . NEW BOOKS . . .

"Operating Under the Labor-Management Relations Act." Texts of papers presented at a conference of the American Management Assn. on operations under LMRA and on the relation of wages to productivity are included in booklet. American Management Assn., 330 W. 42nd St., New York 18. $1.25. 63 p.

* * *

"Mathematics at Work," by H. L. Horton. Manual for machine designers, tool engineers, gage designers, draftsmen and other professional workers reviews practical applications of arithmetic, algebra, geometry, trigonometry and logarithms. Industrial Press, 148 Lafayette St., New York 13. $6.00. 728 p.

* * *

"Proceedings of the Society for Experimental Stress Analysis, Vol. VI, No. 1." Papers describing and interpreting stress studies have been collected in the most recent volume of this series. The collapse of long cylindrical shells under external pressure, photoelastic study of stresses in U-shaped members, strain gage tests on concrete reinforcing rods and other investigations are reported. Addison-Wesley Press, Inc., Kendall Sq., Cambridge 42, Mass. $6.00. 137 p.

* * *

"Labour-Management Cooperation in United States War Production." Report describes the participation of labor and management representatives in the agencies directly concerned with manpower mobilization and production planning during the last war. The suggestion that similar machinery and voluntary cooperation could render service in peacetime production is made. International Labour Office, 1825 Jefferson Place, Washington 6. $3.00; paper-bound, $2.25. 405 p.

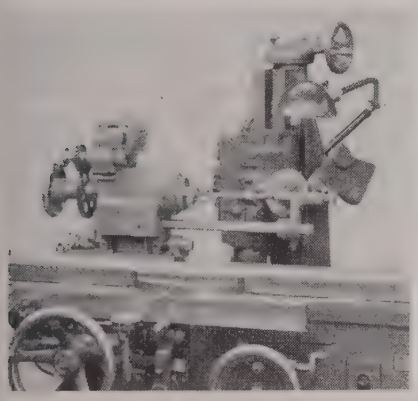
* * *

"Self-Analysis Quiz for Supervisors and Executives," by Rexford Hersey. Booklet provides a questionnaire permitting self-examination by supervisors and executives of their knowledge of the various basic functions of their positions. American Management Assn., 330 W. 42nd St., New York 18. 25¢; reduction for quantity orders. 24 p.

New Production Ideas . . .

New and improved equipment described this week includes: Surface broaching machines, swing lathes, stamping and assembling presses, a spline burring machine, an induction heater, a flash-butt welder, plate bending rolls, a form relief grinding fixture, a portable hardness tester, carbide thread ring gages, carbide toolholders, a bed way lubricant, wire rope slings, and gasoline industrial trucks.

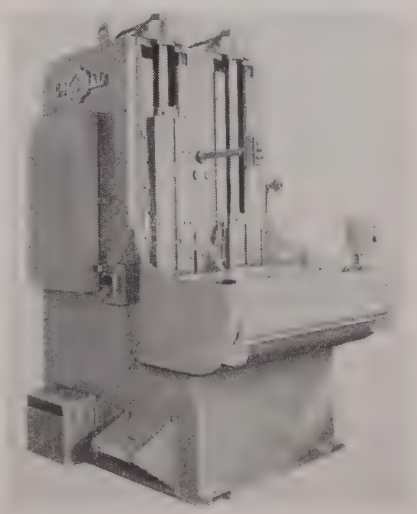
AN *on center* spiral and radial relieving fixture, the Spi-Rad, can be fitted to any universal tool grinding machine, can be mounted



by one person and is simple to use. The attachment will reproduce the exact form on the wheel; do the most intricate spiral and radial relief tool work; and is said to improve precision cutting-tools a minimum of 500 pct. It is claimed Spi-Rad formed tools never leave center, wear evenly at all points, and have exact dimensional contour that remains constant throughout the life of the tool regardless of the number of sharpenings. The number of flutes desired, from one to six, is controlled by a quick, simple gear change. All teeth are cut in a true cycle, because of geared indexing. A cam assembly gives the fixture helical or spiral motion. On the back side of the fixture is a sine bar that is adjustable to give the required amount of radial or diametral relief. Another sine bar on the left side is adjustable to give the required helical or spiral relief. After the form has been ground, a relief actuating mechanism is engaged and the tool is relieved without cams or removing the fixture from the machine. *Glenbard Tool Manufacturers, Inc. For more information, check No. 1 on the attached postcard.*

Broaching Machines

A LINE of Dual-Ram broaching machines designed for surface broaching feature new hydraulic and all electric control systems, a cycle control system that virtually eliminates machine idle time for re-loading, and a forward



and reverse jog cycle to simplify setting up. Nine basic sizes include a 6-ton model, 42 or 54-in. stroke; 10-ton, 42, 54, or 66-in. stroke; 15 and 25-ton, 48 or 66-in. Increased output efficiency is accomplished by having the machine continue through its next cycle if loading is finished before the first cycle is completed. A new table and column construction giving more direct stress absorption increases accuracy of output. A forced draft cooling system provides improved cooling of the interior of the column. With the new all-electric cycling control, the machine can operate on automatic continuous cycle; on single cycle or semi-automatic cycle with pre-set control; on forward or reverse jog cycle, with ram and platen movements interlocked to prevent accidental damage to broach or part. Control units are group mounted in two panels on the sides of the machines. *Colonial Broach Co. For more information, check No. 2 on the attached postcard.*

Spline Burring Machine

A NEW flytool machine can burr a spline where the adjacent shaft diameter approaches the root diameter of the spline. While primarily a single purpose device for spline burring of either involute or straight spline, it can handle more than one size, provided the parts lend themselves to the general specifications of the machine. In operation the part is placed in a receiver and the hand or air-operated clamping device forces the part into a ro-

tating spline collar and forward against a positive stop. Part and cutter are timed together, the flytool passing through the spline-tooth chamfers a 30° to 40° angle

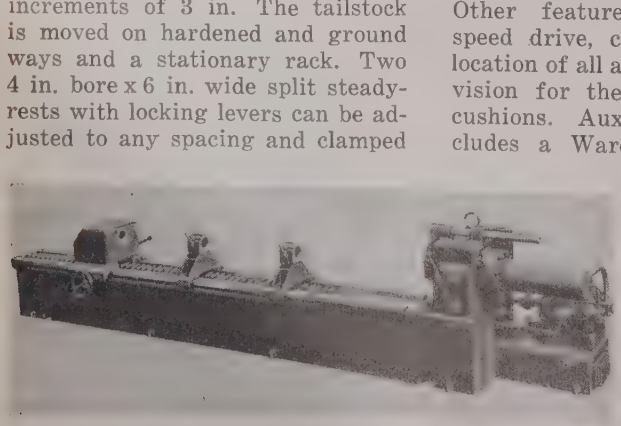
on each side of the tooth. In many cases splines may be chamfered in the root as well as on the sides. After the part has made a complete revolution, burring all splines, the operator is signaled by a light. It is reported that an average 10-tooth spline can be burred in approximately 3 sec. *Sheffield Corp. For more information, check No. 3 on the attached postcard.*

Swing Lathes

A NEW series of 13-in. swing toolroom and quick change gear lathes feature an improved headstock spindle with increased bore and collet capacity, new tailstock base with improved bed way wiper system, and new one-point oiling system for reverse lever bracket and twin gear bearings. The headstock spindle has a 1⅜ in. bore and will take No. 5 South Bend collets of 1 in. max capacity. General specifications of the lathes are 13⅛ in. swing over bed; 7¾ swing over saddle cross slide; 48 pitches of screw threads, 4 to 224 per in. right or left hand; 48 longitudinal power feeds, 0.0015 to 0.0841 in. right or left hand; 48 power cross-feeds, 0.0006 to 0.0312 in.; 8 spindle speeds, 34 to 875 rpm; 4, 5, 6, or 7-ft bed lengths. *South Bend Lathe Works. For more information, check No. 4 on the attached postcard.*

Horizontal Assembling Press

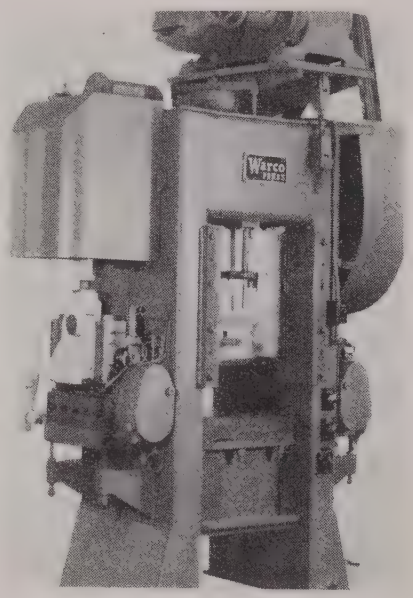
HAVING an adjustable tailstock capable of resisting full tonnage makes this press adaptable for assembling a variety of propeller stub shafts in tubes. Daylight is adjustable from 30 to 180 in. in increments of 3 in. The tailstock is moved on hardened and ground ways and a stationary rack. Two 4 in. bore x 6 in. wide split steady-rests with locking levers can be adjusted to any spacing and clamped



to the ways. The ram has an auxiliary guide. A two-way variable delivery pump is directly connected to a 15 hp electric motor. Similar presses are used to assemble right and left hand rear axle tube assemblies to rear differential housings. Stroke is 17 in.; pressing speed is variable up to 114 ipm; return speed variable to 242 ipm. *Oilgear Co. For more information, check No. 5 on the attached postcard.*

Stamping Press

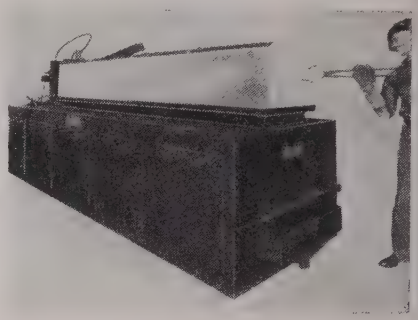
CAPABLE of producing stampings accurately and continuously at high speeds, a 75-ton press is of welded and stress relieved



steel construction with hand-fit square gibbing to assure accurate alignment. The full eccentric shaft has extra long, rigid supporting bearings, and air counterbalancing reduces shock of break-through. All wearing surfaces are lubricated by an automatic lubricating system. Other features include variable speed drive, convenient accessible location of all adjustments, and provision for the installation of die cushions. Auxiliary equipment includes a Warco precision double roll feed designed for high-speed operation. Infinite variation is possible in feed lengths, from zero to maximum. The height of feed line is adjustable. *Warco Press Div. Federal Machine & Welder Co. For more information, check No. 6 on the attached postcard.*

Induction Heater

DELIVERING a 2½ x 3 15/16 in. steel blank every 4.8 sec. right to the mouth of the forging machine with every blank at 2200° F, a new Ajax-Northrup heater per-



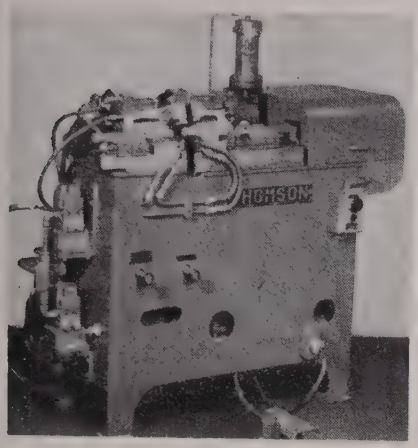
mits the operator to tong the billets into the dies at high speed without extra steps or conveyer systems. The heater is said to reduce rejects, and permits cleaner, more precise forgings. Since it heats so fast, there is little time for scale to form. Blanks are fed into a chute at the far end, from which they automatically feed into the heating coil by a hydraulic pusher. As each cold billet is pushed in the far end, a hot billet is pushed out at the press end. Timing is automatic. Power source is a 700 kw, 960-cycle motor generator unit. *Ajax Electrothermic Corp. For more information, check No. 7 on the attached postcard.*

Resistance Welding Control

A SINGLE-phase to single-phase low frequency electronic welding control that has a lower kva demand and a higher power factor than the standard model makes possible welding of scaly or rusty steel with a minimum of spitting from the electrodes and can be used for welding brass or aluminum. This control, by means of electronic tubes, converts current at line frequency to current at lower frequency. The complete unit consists of a sequence panel which coordinates electrical functions of the control with the mechanical functions of the welder; the frequency control circuit; and a weld timer which times duration of the welding current. The control is designed for connection to a resistance welding machine having a specially constructed transformer with a center tapped primary. *Westinghouse Electric Corp. For more information, check No. 8 on the attached postcard.*

Flash-Butt Welder

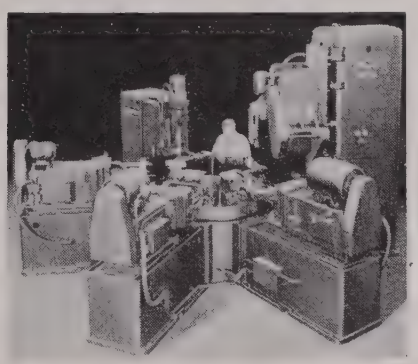
THE new Synchro-Matic flash welder provides automatic control of flashing and upset with the entire welding sequence precisely



synchronized and reduced to a simple, push-button process. The machine is simple to operate as it is provided with settings and calibrated scales for upset and flash-off distances and for welding time. Values recommended or known to produce good welds are used to set up the machine and the work is clamped. Once the operation is initiated the machine takes over. Flashing takes place during a relatively slow, accurate and smooth acceleration and at the most favorable moment, the upset occurs as an additional acceleration of the moving platen, producing the actual weld. Operation involves only three simple settings and pushing a button. The machine produces welds in mild or alloy steels, bronzes, brasses and aluminum and magnesium alloys. Manual, pneumatic or hydraulic clamps and any standard or special tooling can be mounted on the table top platens. *Thomson Electric Welder Co. For more information, check No.* 9 *on the attached postcard.*

Double Loading Machine

A SPECIAL machine that permits double loading increases its output of water pump bodies. Parts are milled, drilled, bored, reamed and tapped at a rate of 90 pieces per hr with only one unskilled operator. With each cycle of the machine, the operator loads a new water pump body at the first work position and transfers a semi-finished part from the first to the second position. The second operation work is completed simultaneously with the first chucking. Parts can be loaded while the machine is cutting and 10 parts are machined at one time progressively. The machine has a six-station, power-operated index table and has two station work holding fixtures for handling operations on opposite ends of the parts. Standard subassemblies can be regrouped into various combinations for producing many different parts. Hydraulic feeds are provided for milling, drilling, boring and reaming; individual lead screw feed for tapping;



and work cycle is push-button controlled. *Cross Co. For more information, check No.* 10 *on the attached postcard.*

Small Diecasting Machine

STANDARD zinc alloys, lead and tin based metals can be handled in an improved small high speed diecasting machine. Versatility of the machine is possible by a new type hydro-action nitra-alloy line pot which uses hydraulic suction to fill the cylinder. This model M55A/HF is an inexpensive air-operated diecasting machine utilizing low-cost, single cavity dies operating at high speed. Production is rated at 20,000 shots per week. It produces smooth, clean, relatively flash-free castings and eliminates almost all secondary operations, leaving only tumbling and finishing to complete the product. *DCMT Sales Corp. For more information, check No.* 11 *on the attached postcard.*

Carbide Insert Toolholders

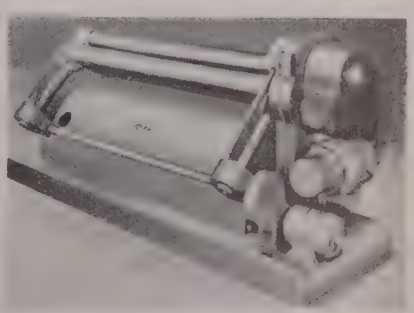
DEVELOPED for carbide and cast alloy inserts, the new Bulldog toolholder line includes vertical ejector-type holders to hold square, round, triangular, rectangular and parallelogram inserts in a complete line of sizes, and horizontal toolholders and inserts for turning, facing, boring and cut-off operations. Inserts are held rigidly in position with an adjustable clamping pin. *Vascoloy-Ramet Corp. For more information, check No.* 12 *on the attached postcard.*

Check Valves

CONE check valves developed during the war years are now available for general aviation and industrial use. The valves qualify under Army-Navy aircraft specifications requiring life tests of 50,000 cycles involving peak impulse pressures 150 pct of rating, after which leakage is less than one drop per hr. The design provides for uniform low pressure drop over a wide range of flow rates and is chatter-free. The valves are anodized aluminum bodies and stainless steel poppets for pressures up to 1500 psi, or with cadmium-plated steel bodies and heat-treated steel poppets for 3000 psi service. Ports are threaded in $\frac{1}{8}$ to $\frac{3}{4}$ in. pipe size, or for tube sizes $\frac{1}{4}$ through 1 in. OD. All types function in a temperature range of −65° to +160° F, and open under 4-8 lb directional pressure. *Parker Appliance Co. For more information, check No.* 13 *on the attached postcard.*

Plate Bending Rolls

THE new Series 600 plate bending rolls is equipped with three 6-in. diam forged steel rolls and driven through a totally enclosed worm gear drive. All bearings throughout the machine are made of solid bronze and are precision bored for the main roll journals. The main frame and housings are built with welded construction, and housings are connected with anti-torque type connectors to prevent twisting of frames during heavy rolling operations. An automatic



drop end automatically raises the top roll when the drop end is lowered for removal of fully rolled

circles. Dual capacity ratings are given for all machines showing ratings for mild steel and stainless steel. Standard equipment includes 5 hp squirrel cage motor with reversing control, three roll drive to main rolls and manual roll adjustment to two lower rolls. Working lengths are 50, 62, 74, and 98 in. *Reed Engineering Co. For more information, check No.* 14 *on the attached postcard.*

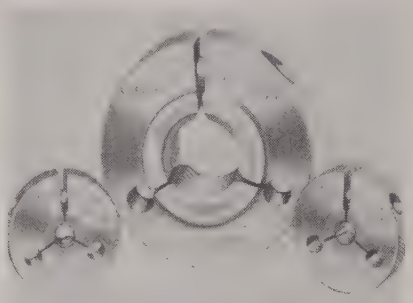
Portable Hardness Tester

WEIGHING 2½ lb and made for testing dies, cutters, saws, gears, round and flat stock, tubing, and odd-shaped parts, up to 2 in. the Model 2 hardness tester uses the Rockwell penetration method of testing the hardness of metals by applying pressure to the penetrators by screw action. Tests are made directly in the Rockwell scales, with the penetrators and pressure loads specified in the Rockwell conversion chart. As the large hand-wheel is turned to increase

the pressure, the tester frame is forced open, the lever on the front of the frame lifts, causing the indicator hand to move around the dial. The action is minute and can be continued indefinitely without altering the frame. The complete equipment includes one diamond penetrator, one 1/16-in. ball penetrator, one short and one long flat anvil, one short and one long V anvil, two hard steel test blocks, one brass test block and Rockwell conversion chart. *Ames Precision Machine Works. For more information, check No.* 15 *on the attached postcard.*

Carbide Thread Ring Gages

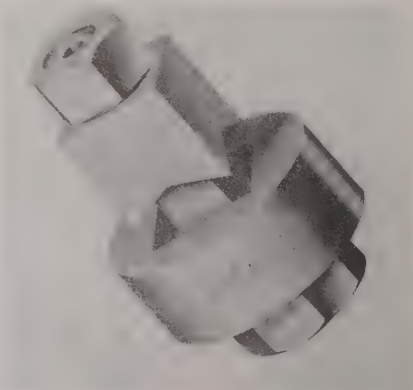
NEW *go* and *no go* carbide Dualock adjustable thread ring gages are said to eliminate the hazard of gage wear on close tolerance work. As master or reference gages they have the long wearing qualities and stability required. The gages are adjustable because they have the same AGD locking mechanism as steel rings. To preclude the possibility of interference, they



are relieved at the major diameter, thus assuring the required contact on the thread flanks but not on the crest or root. They are convoluted on both ends to remove partial threads up to the start of the full thread and precision lapped to remove grinding marks and irregularities on the thread flanks. *Pratt & Whitney. For more information, check No.* 16 *on the attached postcard.*

Square Hole Punch

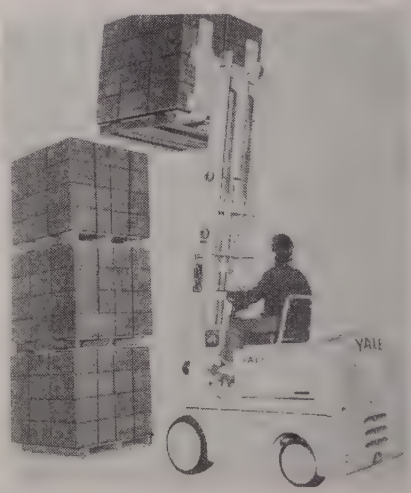
THE chassis punch has been developed for cutting square holes in sheet metal. In addition, angular, rectangular, L shaped, or any square corner pattern type hole can be cut by a combination of cuts. The basic idea of the square punch involves a double-action shear on each side of the square, applied by the screw principle for punching power. Clean flat edges



result. There is no tearing, crushing or distortion of the metal. A round hole for the guiding screw bolt to pass through is drilled, punched or pierced in the sheet metal. The bolt is inserted through the die and the hole from the under side of the sheet metal and the punch is slipped over the threaded portion and on to the square body of the bolt. The nut is screwed on the threads and turned with a hex head wrench, forcing the punch through the metal, and cutting the square hole. Chassis punches are made in square sizes ⅝ and ¾ in. *Pioneer Broach Co. For more information, check No.* 17 *on the attached postcard.*

Gasoline Industrial Trucks

GASOLINE-POWERED industrial trucks, known as the Lift King line, feature fluid drive, automotive controls, hydraulic piston lift in two stages by means of a ram-within-a-ram, and low-mast heights with high free lifts. Load-



ing, clamping, rotating and fork-adjusting accessories that characterize modern truck adaptations to special handling functions for special industries all operate hydraulically. The hydraulic lift permits a full 66-in. load-lift before telescopic mechanism begins to rise. Maximum lifting height is 130 in. and collapsed height is 83 in. Handling capacity is 6000 lb loads. A second model has a free lift of 51 in., maximum height 100 in. and collapsed height 68 in. Lifting speed is 30 fpm at full load. *Yale & Towne Mfg. Co. For more information, check No.* 18 *on the attached postcard.*

Floor Truck

A GENERAL purpose floor truck and conventional lift truck has been designed for handling loads up to 1000 lb. Operation is simple and rapid, the load being elevated

by pulling down the bar handle. Settling the load to the floor is done by pressing the thumb handle release and easing the handle upward. The 18-in. width of the unit permits use in small areas. The truck is made with lowered heights of 3½, 6, 7, and 9 in., and with carrying frame lengths of 36 and 48 in. *Barrett-Cravens Co. For more information, check No. 19 on the attached postcard.*

Dip Treatment for Zinc

THE new Unichrome Dip Compound 95 produces corrosion-resisting, conversion coatings on hot dipped zinc, plated zinc, and zinc diecastings. Four different finishes can be produced depending upon the degree to which the compound is diluted; on zinc plate, a clear bright finish that looks like chromium or an olive drab finish; on zinc diecastings, a clear bluish finish or an olive drab one; on hot dipped zinc, a bright spangled finish on an olive drab one; on all zinc, a coating that serves as a base for paint, lacquer, or enamel. *United Chromium, Inc. For more information, check No. 20 on the attached postcard.*

Portable Vertical Sander

A NEW vertical sander, weighing 8 lb 7 oz and having overall height of 7 in. is a medium-duty model, particularly suited for precision work. The tool is also designed for use as a grinder with cup-type, counter-bored center wheels and cup wire brushes. It is available in free speeds of 4500, 5500, 6000, 7200, and 8500 rpm. It is equipped with the new Stream-Power generator, assuring constant speed under load. *Buckeye Tools Corp. For more information, check No. 21 on the attached postcard.*

Bed Way Lubricant

A NEW lubricant, called Way Lubricant D, is designed for use on all kinds of hardened steel, chilled cast iron or the new laminate industrial tableways. Experiments show that use of the lubricant will eliminate the chattering and jumping effects that occur at the beginning of a tool stroke. Compounded with special additives, the new product will not squeeze or pressout, either when the machine is in motion or standing still. The oil film on the way remains constant and desired precision may be maintained. The product is non-corrosive to steel and copper and will not plug filters. It possesses low static and running coefficients of friction and the required tackiness. *Beacon Laboratories, Texas Co. For more information, check No. 22 on the attached postcard.*

Automatic Fire Extinguisher

AN automatic sprinkler type fire extinguisher, constructed of heavy brass needs no piping or other installation. It hangs up and is ready to operate, utilizing the new fire extinguisher fluid known as C.B.M., or Chlorobromomethane. Flame does not have to touch the unit. When fire occurs, heat waves cause the sprinkler head to discharge under pressure a wide, fast-moving spray of combined carbon dioxide and atomized C.B.M. This blankets and snuffs the fire, with no residue, stain, or damage. It is said to be equally efficient on oil, grease, flammable liquid, lacquer paint, solvent, or electrical fires. It is non-freezing, and has minimum specification capacity of 700 cu ft. *Stop-Fire, Inc. For more information, check No. 23 on the attached postcard.*

Wire Rope Slings

FEATURING nine-part interlaced construction, Tuffy slings are now delivered as a complete package with required fittings, ready to hitch on tough jobs. Metal tags on the slings indicate their safe working load limits on straight pulls. Each sling or leg of a bridle sling is proof-tested to twice the safe working load. The slings are ultra-flexible and can be bent around small radii without damage. Diameter sizes range from ¼ to 1½ in. with eyes 4 to 18 in. *Union Wire Rope Corp. For more information, check No. 24 on the attached postcard.*

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Metallizing Guns

INFORMATION on electric powered metal spraying guns is given in folder. Concentrated spray, finer deposits and less oxides in coating are claimed for the guns. Spraying speeds for the different metals are listed. *Metallizing Co. of America. For more information check No.* 25 *on the postcard.*

Glass Insulation

USE of glass in fiber form as an insulating material is described in two bulletins. Use on machine tool motors is discussed in one release and use of yarns, tapes, cordage, braided sleeving and other forms of the material is covered in a second booklet. *Owens-Corning Fiberglas Corp. For more information, check No.* 26 *on the postcard.*

Stud Welding

APPLICATIONS in which stud welding has provided savings and improved design are described in release. Use in the production of a compressor crankcase, pumps, blowers and other jobs is cited. *Nelson Stud Welding, Div. of Morton Gregory Corp. For more information, check No.* 27 *on the postcard.*

Welding Electrodes

ELECTRODE selection chart and detailed information on applications and the physical properties of weld metal are given in 24-page booklet. Accessories, including safety equipment and electrode holders, are also covered. *American Agile Corp. For more information, check No.* 28 *on the postcard.*

Paint Circulating Systems

BULLETIN 550 discusses paint circulating systems which enable the finishing of parts and subassemblies in different plant departments with perfect color match and finish in the assembled product. *Binks Mfg. Co. For more information, check No.* 29 *on the postcard.*

Dies

BOOKLET gives information on the design and construction of dies. Considerations of product design are discussed, and typical die jobs, including automobile turrets, bathtubs and other items, are described. *Mardigian Corp. For more information, check No.* 30 *on the postcard.*

Surfacers and Grinders

BULLETIN gives information on surfacers, grinders and specimen preparation equipment for the metallurgical laboratory. Wet power grinders and surfacers, diamond dresser attachments, belt surfacers and other units are described. *Buehler Ltd. For more information, check No.* 31 *on the postcard.*

Material Handling

USE of material handling trucks and accessories in a variety of jobs is described in booklet. The handling of bottled beverages, building supplies, petroleum products, farm machinery, ceramics and other items is discussed. *Clark Equipment Co., Industrial Truck Div. For more information, check No.* 32 *on the postcard.*

Flexible Coupling Selector

SLIDE rule type flexible coupling selector has been made available. Selector correlates horsepower, application and rpm at which the coupling is to travel and thereby establishes the correct coupling size for the job. *Falk Corp. For more information, check No.* 33 *on the postcard.*

2/10/49

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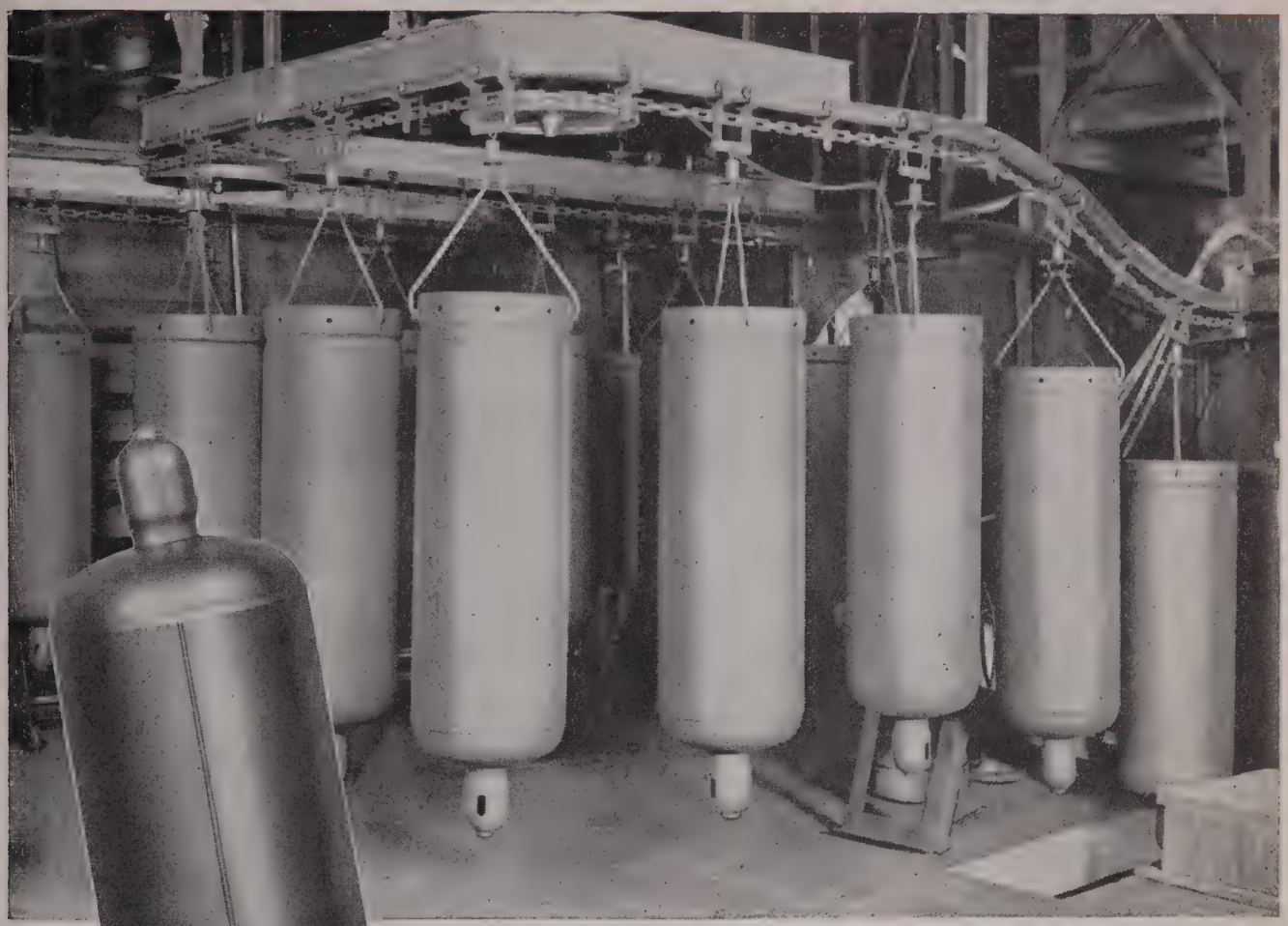
means light weight with added safety and durability



Photographs of the Lee cylinder, courtesy of the Steel Cooperage Company, Detroit.

Because of the greater strength and excellent fabricating, welding and copper brazing properties of this low-alloy, abrasion- and corrosion-resisting steel, cylinders made with it (to conform to I.C.C. safety requirements) are 35% lighter in weight than when made with conventional carbon steel.

This weight reduction (with longer life) means greatly reduced shipping and handling costs . . . and over-all savings to consumers.

MAKE A TON OF SHEET STEEL GO FARTHER
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GREAT LAKES STEEL CORPORATION

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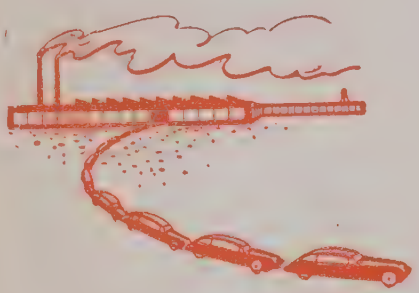
Assembly Line . . .

WALTER G. PATTON

• Industry's critics look at the new 1949 models . . . The 100 pct postwar car is still to be produced . . . Mr. Hunt leaves Kaiser-Frazer.



DETROIT — Of the postwar model cars, only the Chrysler lines are yet to be publicly introduced. This may be, therefore, as good a time as any to look critically at the new 1949 models.

In the opinion of many Detroiters, the most valid criticism of the 1949 cars is that they are too vulnerable in case of accident. There is too much exposed and unprotected- metal. And, with even a minor repair bill starting at $15, it is going to be necessary for the car manufacturers to do something about this. The critics say it is entirely proper to insist that the cost of making minor repairs to fenders is just as much an operating cost as buying gas and oil.

Few car owners go through an entire year without at least a small dent in a fender. There is no good reason, most car owners think, why *both* the car manufacturer and the repair shop should be condemned every time the car owner has a fender bumped out. It seems to many observers here that the most important statistical reading for the car manufacturers and stylists right now is the alarming rise in insurance costs. A second criticism here is the failure of the industry, generally speaking, to offer greater operating economy to the motorist. Nash, Kaiser - Frazer, Studebaker and Willys have given this factor considerable weight. Other producers have elected to give, in preference to fuel economy, greater riding comfort, increased roominess and snappier performance.

All car producers promise greater operating economy in the future and GM's high compression engine development shows what can be expected ultimately. What the public will have ultimately to understand is that, without high octane fuel, you can't have jack rabbit getaway, outstanding roadability and bigger cars at the same time you have outstanding gas economy. One of these characteristics must be sacrificed in favor of the other.

Another criticism of the industry is its ornate grilles and relatively weak bumper protection. Most of the grilles on the '49 cars are—mercifully—simplier than the 1948 models. Several could be simplified even further. Also, the use of low carbon, easily dented bumpers is going to require some justification in the minds of many new car owners.

IN the public mind, the price of all cars, without exception, is too high. (This is also true of new housing and groceries.) If the prices are too high, they will come down in this order: (1) dealers' allowances for your old car will be increased, (2) manufacturers will reduce their list prices. Some dealers are already saying publicly, "We don't want your old car." What they are actually telling the public is, "We can't sell your old car at a profit and we don't want to take a loss on it." This is, of course, only a subtle form of price reduction.

Real prices for cars are already coming down; and they'll fall much further about June if the spring selling season is disappointing. It is difficult to see how several of the independent manufacturers can continue for long to offer their cars at present prices. Of course, this conclusion would have to be revised if another inflationary spiral sets in for any reason not now foreseeable.

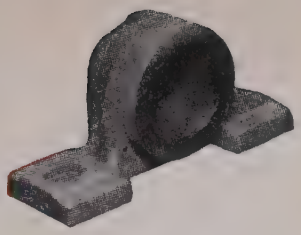
Some of the industry's critics feel the car makers have missed the boat by failing to bring out a light car. A realistic appraisal of the situation boils down to this: existing producers have to decide whether it is better to offer the public a good big used car or a new small light car. Few people, placed in the car producer's position, would take a different course than that being followed by the present car companies.

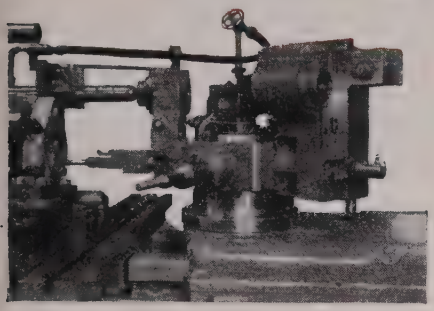
IN the opinion of informed sources, a successful light car will undoubtedly have to be built and introduced by some independent producer, preferably a new company. This new light car should be aimed directly at the *second* car market. (There are already 1,400,-000 2-car families in U. S.) Preferably this new light car should be radically different in design and should take full advantage of the new light materials and airplane-type construction. On this basis, the proposed new Davis car is undoubtedly the most promising light car to date. If car producers have guessed wrong about the market for a light car, as many of the critics say, a new producer like Davis should reap a real harvest, provided the car is properly engineered and the company is efficiently managed.

The fact that aluminum will be used generously is one of the most significant features of the new Davis car as many Detroiters see it. A growing number of Detroiters have come to the conclusion that a successful new light car, if it comes, will come first from California rather than from Detroit.

In the 1949 models the industry has done an efficient job of silencing its critics who felt that improved visibility was desirable. There is still a considerable amount of criticism for lack of headroom and insufficient legroom. Chrysler has done an outstanding job in providing legroom and headroom. How-

Take this Cast Iron Pillow Block





Apply this P&J Chucking and Tooling

The work is held in an air-operated combination chuck and fixture. Then:

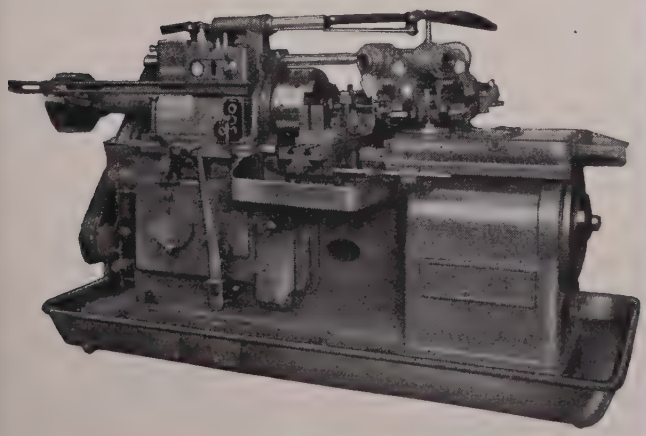
1st T. F.: Rough bore hole and two counterbores; chamfer O. D. of Hub

2nd T. F.: Finish above cuts; chamfer counterbore

3rd T. F.: Machine oil slinger groove; machine snap ring groove; rough form ball race and face end

4th T. F.: Machine ball radius with single point tool

5th T. F.: Size bore counterbore



Do The Job With Maximum Speed At Minimum Cost On This Powerful, Precise P&J 4DE Automatic Turret Lathe with 15 changes of speed arranged in 5 sets of 3 automatic changes; 27 feeds arranged in geometric progression; built for permanency of alignment, freedom from scoring, and long life.

WRITE FOR BULLETIN GIVING COMPLETE SPECIFICATIONS

ALL THIS *Precision Work* DONE IN 2.28 MINUTES WITH P&J High Production Tooling ON THE P&J 4DE AUTOMATIC

Skilful tooling — the ability to group and combine operations, often on a single turret face — is the secret of the outstanding success with which Potter & Johnston combines high precision with high speed and consequent low cost parts production.

That is why you may find it very much worth your while to submit your parts or prints to P&J for tooling suggestions, estimates and time studies. It involves you in no obligation and may uncover savings of truly great significance.

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ever, the ample floor tunnel in the Chrysler models invalidates this conclusion somewhat.

ONE thing seems reasonably certain: during 1949 Chrysler is going to make a great many people think it is an enormous crime to knock a hat off in a car. In the future, legroom and headroom are almost certain to get higher priority in automotive styling sections. It is a reasonable certainty that GM's famous dummy, Oscar, who tries out all the new GM cars, is going to be fattened up and maybe a section will be inserted, figuratively speaking, somewhere between his lap and his head.

The lack of individuality in today's cars has invited unfavorable comment. However, with each producer striving to widen the body and give more seat room while simultaneously increasing baggage space and visibility, this was fairly certain to happen. With the return of a highly competitive market, it is expected that more individuality will be evident in the new motor cars. You'll see some of this in the 1950 models and even more in the 1951 cars. As many Detroiters see the situation, the auto industry is only beginning a new era of real competition — pricewise, stylewise and performance-wise.

ANOTHER point about the postwar cars has, generally speaking, escaped the public. We really haven't seen an *entirely* new postwar car even yet—5 years after production was resumed.

Take Cadillac for example: the 1949 model has a brand new engine and a body that is entirely new. The chassis and the transmission, however, are essentially unchanged. Hudson has a new chassis and an entirely new body. The engine of one Hudson model was unchanged and the second engine has only minor revisions.

Take Ford: there is a new body and a brand new chassis. The engine and the transmission have been modified in only a minor way. Oldsmobile has a brand new engine and an entirely new body. The chassis and transmission are modified versions of the prewar design. Studebaker was the first to introduce postwar styling. The Studebaker chassis and powerplant are improved prewar vintage.

It takes time to build an entirely new automobile. The first work on automatic transmissions of the present design started at General Motors in the early 1930's. Hydramatic was introduced by Oldsmobile in 1939. Nine years later Buick came along with the first important modification of the original automatic transmission design—the Dynaflow. Other car manufacturers have been working on similar automatic shifting devices for years. Packard, Studebaker, Chevrolet and probably Lincoln are just now getting well along into the tooling stage on new postwar transmissions. All of these designs, it is believed, will be torque converter types.

Take another example. Cadillac first began work on its new engine more than 11 years ago. Even without war interference at least 7 years of experimental work would have preceded the introduction of the new Cadillac engine.

It is significant that only Hudson has come out with an entirely new chassis in the postwar period. It is known, however, that other producers have done a tremendous amount of research work on chassis design. The results of this work will not become evident for another year or two.

It takes time to build a brand new car that is really new from tires to top. Not a single car producer has done it yet. And none is likely to do so at least until 1951.

THE resignation of E. J. Hunt, production genius behind the conversion of the huge Willow Run plant for Kaiser-Frazer, was announced this week. Sources close to K-F have reported that a break with K-F has been imminent for months. Mr. Hunt has made no announcement as to his future except that he plans to "lead a life of leisure."

As operations manager of the Chrysler Tank Arsenal during the war, Mr. Hunt received the first Army-Navy E Award. The announcement 4 years ago that he would join K-F organization to convert the huge B-24 bomber plant to auto production was the occasion for reviving once again the old cry of "Willit Run?" In a surprisingly short time, Mr. Hunt had Willow Run running at a good production pace. The conversion period, considering the magnitude of the job, has hardly been surpassed during the history of the industry.

Later when engines were badly needed, Mr. Hunt was placed in charge of the Detrot Continental engine division of K-F. Over a period of 5 months, the production rate at the plant was tripled. This was in March 1947.

About 6 months ago there were indications that a top office disagreement had occurred at Willow Run. Reports of Mr. Hunt's retirement were denied, but it has been reliably reported that since that time he has been serving mostly in a production research capacity at Willow Run.

This week Mr. Hunt's retirement became official and Detroit settled down to see whether one of its most active mass production specialists would stay retired. Some of his closest friends are convinced that the role of "active retirement" —like C. F. Kettering's retirement—is more likely than a complete severance of connections with the industry. Mr. Hunt's association with the industry goes back to E M F days. He was in charge of tool engineering when Chrysler was formed in 1924 and was staff master mechanic when he was assigned to the Tank Arsenal in 1940.

Plans Silver Anniversary

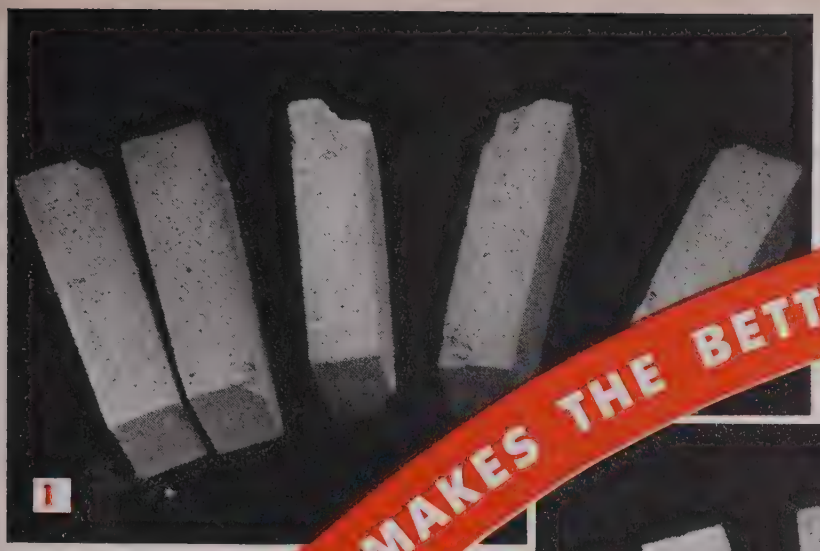
Detroit

• • • **"Chrysler Firsts"** will be the theme of a series of seven Silver Anniversary meetings at which the new Chrysler cars will be presented to dealers throughout the country. Meetings begin Feb. 4 at Atlantic City and conclude March 3 at San Francisco.

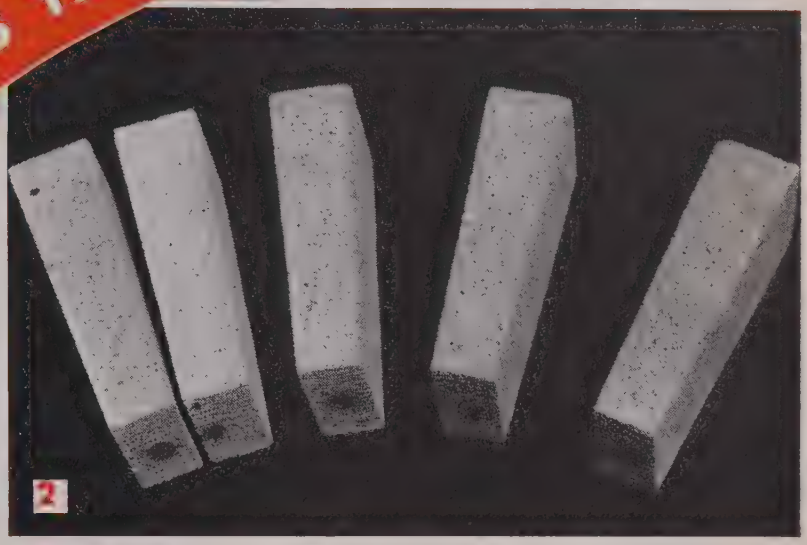
Special displays have been prepared highlighting the introduction by Chrysler of all steel bodies, hydraulic brakes, high compression engines, floating power mountings, fluid drive, superfinished working parts, and other engineering advances during the past 25 years.

Joseph A. O'Malley, general sales manager of the Chrysler Div., will preside at all meetings. Leo Carrillo, motion picture and radio star, will be master of ceremonies.

It is expected that 300 Chrysler dealers and members of their staffs will attend the series of meetings.



WHICH MAKES THE BETTER ARCH?



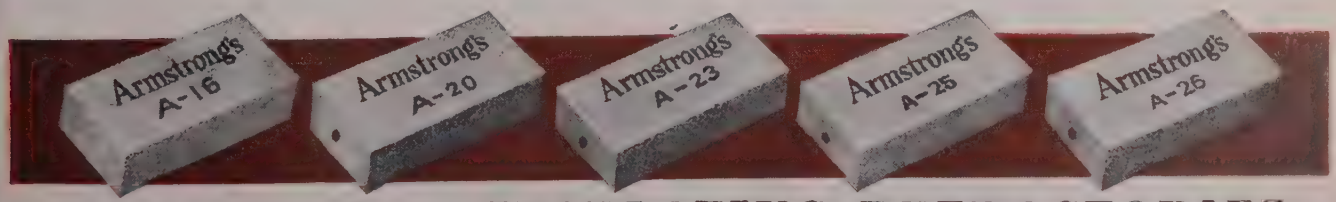
Here are two groups of insulating fire brick showing the condition in which they arrived from the factory. Both groups have approximately the same performance characteristics—with one exception. The difference is: Armstrong's Brick (No. 2) are physically stronger and thus arrive in better condition and handle with less breakage on the job.

Furnace builders who use these Armstrong's Insulating Fire Brick cut to a minimum the problems of uneven edges and broken corners. An arch built of these brick is heat tight and provides the full insulating value the designer planned on. It also allows for a more workmanlike job at lower cost.

The extra strength of Armstrong's Brick is a direct result of its unique "burn-out." Armstrong is the only insulating fire brick maker who uses cork particles to form the cellular brick structure. Because cork doesn't absorb moisture and doesn't react chemically with the clay, the mix can be ideally proportioned of stronger clays without losing plasticity. In firing, cork permits exact temperature control, annealing the cell walls perfectly. The result is an unusually durable brick with a particularly high resistance to both thermal and mechanical shock.

Other advantages of this burn-out include: high insulating efficiency, light weight, low heat storage, great uniformity. These advantages are found in each brick in the Armstrong Line—for temperatures from 1600° to 2600° F.

FREE BOOKLET on insulating fire brick simplifies your buying problems. Write for it today. Armstrong Cork Company, Industrial Insulation Department, 4902 Mulberry Street, Lancaster, Pa.



ARMSTRONG'S INSULATING REFRACTORIES

Washington . . .

EUGENE J. HARDY

• ECA sees important role for technical journals in increasing European productivity . . . European journals found lacking . . . Occupational mortality study coming . . . German imports rise.

WASHINGTON — Technical and business journals, American as well as European, are expected to play a large part in the Economic Cooperation Administration's effort to increase productive efficiency in the Marshall Plan countries.

American experts have gone to Europe to study productive methods. An Anglo-American Council on Productivity has been established. Similar groups will be organized in other countries. The first of 35 United Kingdom productivity teams is scheduled to arrive in New York next week.

In addition to these activities, however, American productivity experts, after on-the-spot investigations in Europe, say that so-called trade papers can be an important factor in increasing productivity.

This realization came about as a result of a careful check of hundreds of plants of all types in England and France. Generally, it was found that production methods in these two countries had not kept pace with the demands of the modern world. With the technical and business journals, much the same was true. These journals were generally of poor quality, judged by American standards, and were not being used properly. Even the better journals were not used to the best advantage in the subscribing plants.

In touring the industrial sections of these countries, the investigators hardly ever came across technical journals on the desks of the plant employees. Those that were found, regardless of their country of origin, were not widely distributed. They were circulated largely among the top hierarchy in the various plants. They rarely got to the divisional or departmental level and foremen and other production workers were just out of the picture. It was also found that the high subscription costs made it impossible for most individuals to subscribe personally, even if they so desired.

THE content of the various European journals also came in for close scrutiny. Technical articles were found to be written for too high-level an audience, primarily top engineers. There was little emphasis on method and organizational problems, personnel matters, and other such items, outside the pure technical fields, which make up a substantial portion of the content of American journals. Scarcity of advertising was also noted and, perhaps even more important, little consistency in product advertising. News coverage, as distinguished from technical articles, was found to be most inadequate.

European trade associations also seemed to lack enthusiasm regarding the distribution of technical magazines. Some associations took the view that they would decide what type of information should go to specific plants and what individuals in those plants should be on the receiving end. Abstracts of abstracts from American and European magazines comprised part of the association output.

While it is not possible to accurately predict what will be done about this situation, government officials concerned with the problem are directing their thinking along two distinct avenues: improvement of European journals, including better distribution, and wider circulation of top American industrial journals.

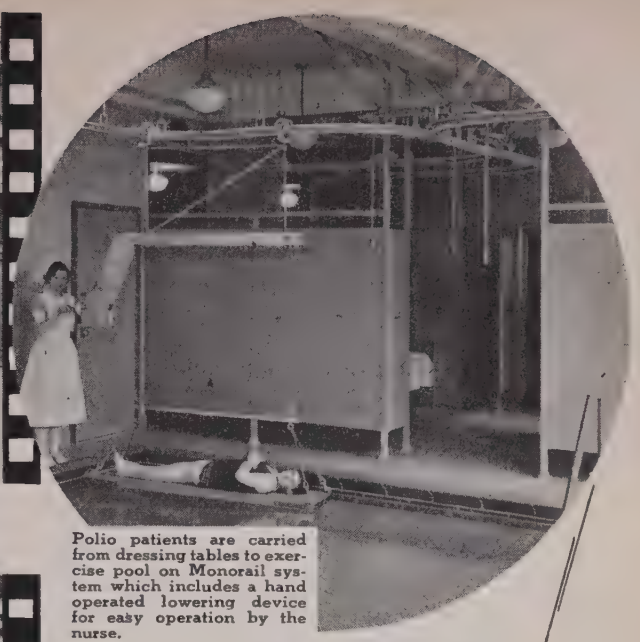
AN occupational mortality study is now being planned for 1950 by the National Office of Vital Statistics of the Public Health Service, which will make nationwide death rates by occupation and industry available for the first time. The job will be a cooperative effort with the Bureau of the Census.

It is expected that valuable data will be obtained from the study. As a measure of the effects of the occupation itself, it will increase the knowledge of the relationship between the more important causes of death and the occupational and industrial environment.

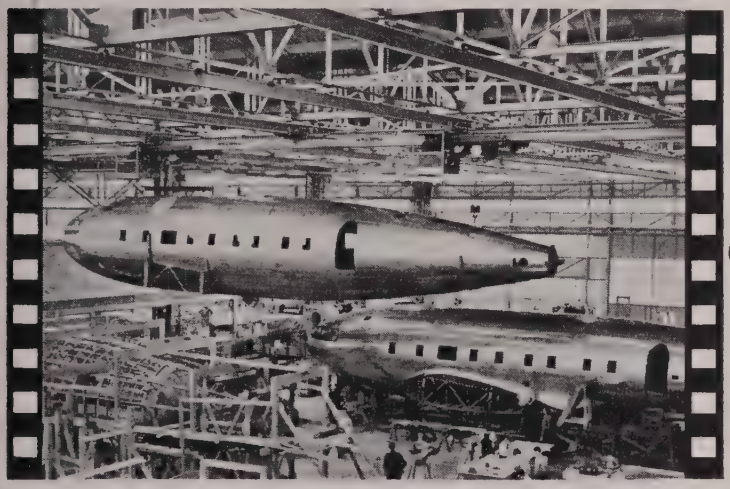
One of the main purposes of this occupational mortality project is to provide data for the use of workers in the field of industrial hygiene. The National Office of Vital Statistics states that it will welcome any suggestions regarding the type of statistics which would be of value to the industrial hygienist. Comment should be addressed to the above office, Washington 25.

MORE than $20 million worth of iron ore was imported into Bizonal Germany last year, according to military government sources. During the first 10 months of 1948, imports of iron

Another demonstration of the MonoTractor drive includes a swinging jib for passage of the carrier over a truck for removal of 2 ton bundles of sheet steel. An electric hoist and a Windsor sheet grab are used.



Polio patients are carried from dressing tables to exercise pool on Monorail system which includes a hand operated lowering device for easy operation by the nurse.



This twin-bridge 5 ton crane is 160 feet long operating on 9 runways. Two carriers, each centered between a pair of crane trucks, can make a lift of 10 tons as shown.

Fruit, unloaded from cars on special trolley racks, rolls around MonoRail curve to a drop section where the racks are lowered to basement tracks. The racks then roll by gravity to ripening rooms.

Try

UP AND OVER HANDLING

before you decide upon any material handling equipment....

Our 16 mm black and white twenty minute sound picture will bring to you the complete story of American MonoRail overhead handling. If you are in the market for any material handling equipment, see our movie first. We will gladly loan you the film for showing in your offices at a time most suited to your convenience. Please drop us a line.

*UP and OVER is the title of our 20 minute 16 mm sound film.

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE CLEVELAND 7, OHIO

one totaled $19,128,110. Included were some 3 million tons of Swedish ores. These imports are necessary if the agreed level of 10,700,000 tons of steel annually is to be reached by the German industry.

Imports of all metallic ores totaled $23,353,000 for the first 10 months of 1948. Other important import totals for this period are: ferrous and nonferrous alloys and metals, $22,267,000; coal and coal products, $19,259,000; crude nonmetallic minerals and products, $8,448,000, and machinery and vehicles, $2,258,000. Total industrial imports (other than food) for the period amounted to $342,183,000. All such imports are paid for with funds realized from German exports.

Considering to Make Funds of Pollution Clean-Up Tax Free

Washington

• • • **Funds spent** by industry in cleaning up polluted water discharged from factories, mines, and mills will be deductable in computing net income, if a bill now being considered by the House Ways and Means Committee becomes law.

The legislation, sponsored by Representative Byrnes, R., Wis., would make such expenses deductable by amending Section 23 of the Internal Revenue Code. The taxable years 1949 through 1954 would be affected by the Byrnes proposal.

Meanwhile, Philip B. Fleming, Federal Works Administrator, estimated last week that New York State alone needs sewage works that would cost more than 1 billion, and that California, Illinois, Michigan, Missouri, New Jersey, Ohio, and Pennsylvania each require sewage undertakings that would involve expenditures of $100 million.

The Water Pollution Control Act of 1948 puts the industrial sewage problem on a national basis and provides for solving it by cooperation of states, their agencies and political subdivisions and industrial enterprises.

The act sets up a program of federal aid to local and state governments and to interstate authorities for the planning and construction of sewage plants needed to control or prevent the pollution of surface waters.

Mr. Fleming estimates that states and cities will need at least $3 billion for treatment works and other installations. As to how much of this figure—and under what terms—should come from the federal government, he makes this proposal:

"The Federal Works Agency took the position that such construction was the responsibility of the states and their political subdivisions. Accordingly, I proposed that federal aid in construction should take the form of loans subject to the following limitations: (a) the priorities of projects shall be established by the Surgeon General; (b) no loan shall be made unless the proposed treatment works shall have been approved by the appropriate state health authority, and by the Surgeon General; (c) no loan shall be made for any project in an amount exceeding 33-1/3 pct of the estimated reasonable cost thereof, as determined by the Federal Works Administrator; (d) all loans shall bear interest at the rate of 2 pct, and (e) the bonds or other obligations evidencing any such loans must be duly authorized and issued pursuant to state or local law."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THAT CRANE WAS SHIPPED IN 'FORTY-ONE, BUT I BETTER SAVE THEM NOTES--THERE MAY BE A KICK-BACK!
THAT BOSS IS RENOVATIN' HIS PORTABLE ATTICS, BUT I'LL BET HE DOESN'T THROW A THING AWAY BUT TH' LINT!
WELL, IT GIVES HIS SUSPENDERS A CHANCE TO SHOW WHAT THEY'RE FOR--IF HE UNLOADS MUCH MORE THEY'LL CUT HIM IN TWO!
J.R.WILLIAMS
2-11
THE LET-UP
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Offer Subsidies Bill

Washington

• • • **New legislation** authorizing premium payments for mining of copper, lead, and zinc has been introduced in the Senate and in the House. Among the sponsors of the subsidy payments bills are Senators Murray, D., Mont.; Hayden, D., Ariz., and McFarland, D., Ariz., and Representative Engle, D., Calif. Hearings before the Senate Interior Committee and the House Public Lands Committee are scheduled to begin within the next two months.

President Truman in 1947 vetoed a congressional attempt to establish premium prices on these metals, stating that "no adequate reason is apparent for continuing to subsidize the output of copper, lead, and zinc."

CRUSH GRINDING USUALLY COSTS LESS THAN YOU THINK!

FOR FLAT AND CYLINDRICAL WORK

Thousands of jobs are being turned out every day very much faster and at considerably less cost by CRUSH GRINDING than they could by any other method.

Of particular significance is the fact that CRUSH GRINDING does not necessarily require a large outlay for equipment. You may require only relatively inexpensive CRUSHTRUE Devices and Rolls to obtain the advantages of this method of grinding. A simple survey of your present equipment will determine that.

Very often the investment in CRUSHTRUE Devices for standard surface grinders will pay for itself in 30 days.

It will cost you nothing to find out about this method. Send us the prints of the work you contemplate and a list of your grinding equipment. We will then give you an estimate of whatever additional equipment you will need. Or—write for Representative to call at your plant.

Thread and Form Grinders, Microform and Visualform Grinders, Gear Chamfering, Burring and Burnishing Machines, Crushtrue Rolls and Fixtures, Special Machine Tools.

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West Coast . . .

ROBERT T. REINHARDT

• All proposed expansion of ingot production not being made public . . . Heavy duty tie plates now in production . . . Unemployment in Northwest grows.

LOS ANGELES—At least one bit of evidence which probably should be on record to substantiate the steel industry's contention that it is expanding at least as rapidly as the laws of supply and demand dictate has been unearthed by THE IRON AGE.

Bethlehem Pacific Coast Steel Corp. has on order a 75-ton electric steel furnace for installation here in the near future which will add just about one-half to its local ingot capacity or more than 100,000 tons per year. This means that Bethlehem Pacific will have tripled its capacity at its Los Angeles Works since the end of the war.

Such a furnace would contribute almost 100,000 tons of sorely needed steel to western industry. This contribution to expanded steel production in the West will be most welcome to southern California users and would to a certain extent counterbalance the threatened loss of ingot production in the San Francisco area where Pacific States Steel Corp. has abandoned its intention to continue to operate the openhearth and electric furnace at the Pittsburg, Calif. government-owned plant.

In calculating production of steel ingots on the West Coast for 1949, most observers were in agreement that Pacific States Steel Corp. would continue to operate steel producing facilities there, but when no bidders were reported at the opening last month, this hope was abandoned. Now that bids for this WAA plant at Pittsburg are being received until Feb. 15, there is hope that some one will take on the furnaces there for ingot production.

Talk within the trade indicated that there would be at least three groups bidding on the Pittsburg facilities adjacent to the plant of the Columbia Steel Co. there, but apparently these were completely unfounded and best available information indicates that there is considerable reluctance on the part of anyone to take over these facilities.

Possibilities of restrictions on electric power supply in the West may have a bearing on this situation, although there is evidence to indicate that 1949 will not encounter the shortages experienced in 1948.

Northern California appears to be in excellent condition for 1949 so far as kilowatts are concerned. The Pacific Gas & Electric Co. has been enlarging its facilities as rapidly as materials and manpower have become available and in 1948 produced approximately 584,000 hp over and above its previous production. In 1948 the peak requirements were 221,000 hp greater than the 1947 peak and it is reported that the 584,000 hp provided a good reserve. It is estimated by the San Francisco Bay Area Council that reserves installed in 1949 provided a gain of 240,000 hp in margin of supply over demand.

Southern California has also increased its production of electrical power and there is every reason to believe that the production of the electric furnace of Bethlehem here will not be restricted. Last year a 50-ton electric furnace was put into operation and after the usual trials and tribulations of a new installation it is reported as producing as economically or at lower cost than the openhearth.

AS has been previously reported, the scrap situation is an important factor in expanding steel production on the Coast, but far-sighted observers indicate that they are optimistic about the future with off-shore scrap moving into this territory and with the government backing a concerted heavy scrap drive, conditions should improve somewhat. There are also straws in the wind which show that automobile wreckers may begin unloading some of jalopies accumulated during the past 8 years as "mines" for replacement parts.

Although completely unconfirmed, there is evidence to believe that Kaiser Co. Inc. at Fontana is also looking ahead to still further expansion. At the close of last year the seventh 185-ton openhearth tapped its first heat and unconfirmed reports are that present plans contemplate an eighth furnace.

It is apparent there is no lack of confidence in the future demand for steel on the West Coast and that private capital is eager and willing to invest in expansions. However, it is believed that only after governmental plans in regard to nationalization of steel and tax policies are known will such expansions actually become public information.

TORRANCE—Production of the largest and heaviest tie plates ever to be made on the West Coast began last week at the local plant of Columbia Steel Co. to fill a large order for the Southern Pacific and other western railroads.

A Cleveland punch and shear with rated capacity of between 1500 and 2000 tons of tie plates per month is turning out 14-in., 25 lb tie plates for use under 133

Use Mold Plugs?

USE CARBON!

Sales of "National" carbon mold plugs jumped nearly 50% in 1948 because:

1 With "National" carbon mold plugs, there is no contamination of ingot.

2 Carbon plugs will not stick to the ingot. They may be used more than once.

3 Carbon plugs are light, yet strong, so handle easily.

4 Carbon mold plugs are consistently accurate in dimensions.

5 Carbon's resistance to thermal shock and hot-metal erosion increases service life.

For more information, write to National Carbon Company, Inc., Dept. IA

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Foreign Department: New York, U. S. A.

lb rails. It is estimated that approximately 87 tons of such tie plates were used per mile of railroad track.

The machine, produced by the Cleveland Punch & Shear Works, is 12 ft high, weighs 65 tons and occupies a 15 x 65-ft section of the Torrance mill. Capable of exerting a pressure of 1200 tons, the machine uses semifinished stock reduced on the 22-in. mill to 1½-in. thickness. The 13-in. to 14-in. wide stock is sheared into 8¾ in. long and punched with eight spike holes.

Tie plates are also produced at the Pittsburg, Calif. plant of Columbia up to 11-in.

Bethlehem Pacific Coast Steel Corp. at Seattle is also producing tie plates of smaller size for the Great Northern, Chicago & Milwaukee, and Alaska railroads. Great Northern is rebuilding practically 4000 ft of mainline track near Wenatchee, Wash., and other western railroads are making major improvements in tracking and equipment.

•

Unemployment Pay Rises

Portland, Ore.

• • • **Business in** unemployment payments is rising, to the consternation of local employers. Principal blame is placed upon the severe winter which has kept lumberjacks out of the woods.

January set a record high for the amount of money paid out in the month for the past 11 years when benefit payments were first begun. Approximately $2,800,000 was paid out to some 153,000 unemployed last month as compared to the 1946 January payment of $2,586,107.

•

Gets Car Repair Contract

Seattle

• • • **Labor in** particular and business in general have been given a boost in morale with the announcement of the Pacific Car & Foundry Co. to the effect that they have received a substantial contract for repair of an unstated number of railroad cars, and the report that the Todd Shipyard Corp. will soon begin alterations on two C-3 type ships.

Pacific Car laid off approximately 800 men last month, reportedly because of the power shortage; and the new contract will enable them to rehire at least that many.

Todd is also expected to hire approximately 1000 men to rush alterations on the two ships which are to be put into service as cargo carriers by Luckenback Steamship Co.

A rise in the number of unemployed at the end of last year was causing some concern. Non-agricultural employment dropped from 682,950 in December 1947 to 687,600 in December 1948. Manufacturing employment rose from 174,550 in December 1947 to 176,900 in the same month in 1948. The big drop in this category occurred between November 1948 when 185,950 were employed and December 1948 the low of 176,900.

The loss in manufacturing employment was somewhat offset by an increase of 5500 in the non-manufacturing group between November and December but this was attributable largely to an increase in the number of employees in post office and retail trade, necessitated by the Christmas season.

•

Scarcity Increases Costs

San Francisco

• • • **While refraining** from charging steel shortages with limiting production of washing machines, ironers and other home appliances, Raymond J. Hurley, chairman of the board of Thor Corp. last week blamed this scarcity for increased production costs.

Inability to buy directly from mills in sufficient quantities has made it necessary for his company to purchase through warehouses at what he termed "retail" prices. There was no criticism of warehouse prices as such.

Increased production and improved operating efficiency were cited as principal factors in holding prices at near present levels.

o o o

GRAVEL PITS: *A Caterpillar D8 tractor with a No. 8S bulldozer is shown at work in the Kaiser sand and gravel pits located between Pleasanton and Livermore, Calif. The plant ships an average of* 160 *carloads a day. A number of diesel engines in locomotives and locomotive cranes are also operating at this plant.*

o o o

For conveying rock to the site of Bull Shoals Dam—a flood control and hydroelectric project.

Those idlers or "rollers" you see above are a vital part of the longest conveyor system in existence.

13,888 of them stretch all the way from Lee's Mountain down to Bull Shoals dam site on the White River in Arkansas, seven miles away.

Now in operation, with the conveyor belt in place, each idler shown above must support the movement of nearly ten tons of crushed rock every minute! Before the Bull Shoals Dam is completed, 4,000,000 tons of limestone will have moved over these Robins Idlers!

The engineers in charge knew that these idlers—made by Hewitt-Robins—could handle this great tonnage . . . and then some. That's because the rigid truss design of Robins Idlers is *stronger than any other type of construction!*

Moreover, they knew that seven miles of idlers, rolling day and night, must be sound in design. And Robins Idlers—with patented One-Shot Lubrication and Triple Grease Seal—*roll longer—take less care, less grease.*

This seven-mile roller coaster is only one of thousands of belt conveyors equipped with Robins Idlers.

Hewitt-Robins is the only company that is prepared to engineer, build, and install both machinery and belting *as a single unit.*

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CONVEYORS

Whether you want machinery, belting, or a belt conveying system, consult Hewitt-Robins.

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PERSONALS

o o o

• **Marshall B. Hall** has been elected to the board of directors of Atlantic Steel Co., Atlanta, filling the vacancy created by the death of John N. Goddard. **Joseph H. Girdler** has been made vice-president in charge of operations. He has been with Atlantic since 1941 and served as openhearth superintendent and general superintendent. **Howard B. Johnson,** who has been vice-president of finance and accounting, has been named vice-president in charge of sales. **Charles F. Williams** has been appointed general manager of sales. **Robert S. Stradley** has been made assistant secretary, in addition to his former position of assistant treasurer. **R. E. O'Neill,** formerly chief schedule engineer, has been named manager of the order department.

• **Robert W. Moffett** has retired as general manager of fabrication, Lukens Steel Co., Coatesville, Pa. Mr. Moffett had been associated with Lukens for 23 years. **Raymond M. Dennis,** who has been assistant to the general manager of fabrication at By-Products, has been named manager of fabrication, By-Products, and **Frank C. Kardevan,** who has been assistant to the general manager of fabrication of Lukenweld, has been appointed manager of fabrication, Lukenweld. Mr. Dennis has been with Lukens since 1925. Mr. Kardevan joined the Lukens organization in 1936.

• **Carl E. Haugh** has been made district sales manager of the eastern and mid-western divisions of Hydropress, Inc., New York. Mr. Haugh has been associated with the company for the past three years.

• **Malcolm D. Corner** has been appointed manager, commercial research, American Bridge Co., Pittsburgh. Mr. Corner comes to American Bridge from the commercial research staff of U. S. Steel Corp. of Delaware. He joined American Bridge in 1946 and became assistant to the contracting manager of the company's Baltimore office in 1947. He joined the Delaware Corporation in 1948.

WILLIAM I. ONG (left), assistant to the president, and LEWIS E. ZENDER (right), director of public relations, American Steel & Wire Co.

• **L. R. Valette,** formerly superintendent of the hot strip mill, Midland Works, Crucible Steel Co. of America, Pittsburgh, has been appointed division superintendent, hot and cold strip mills. Before joining Crucible, Mr. Valette had been associated with the Gary Works of Carnegie-Illinois Steel Corp.

• **T. W. Plante,** who has served as superintendent of blast furnaces at Jones & Laughlin's Eliza Works in Pittsburgh and at the Otis Works in Cleveland, has accepted a position with the Pacific Steel Co. of Chile, at Concepcion, as superintendent in charge of blast furnace operations and raw materials. Mr. Plante is at present located in the New York office of Pacific Steel and will go to Chile in the spring.

• **Walter A. DeLamater** has been elected a vice-president of the Heli-Coil Corp., Long Island City, N. Y.

• **Thomas H. Latimer** has been appointed chief engineer of the Moore & White Co., Chicago.

• **Edward J. Hrdlicka** has been elected a vice-president of Hydraulic Equipment Co., Cleveland. Mr. Hrdlicka has been with the company for over 12 years and has served most recently as chief engineer and as vice-president in charge of engineering. **Harold J. Zimmerman,** vice-president, has resigned to reenter the field of industrial engineering.

• **Lewis E. Zender** has been appointed public relations director for American Steel & Wire Co., Cleveland, succeeding **William I. Ong,** who has been named assistant to the president of the company. Mr. Zender has been a member of the public relations staff of the company for 11 years. **Alvin L. Krieg** succeeds Mr. Zender as assistant director of public relations. Mr. Krieg, former Cleveland bureau manager for International News Service, joined the public relations staff of the wire company in 1946.

• **Louis C. Edgar, Jr.,** formerly president of H. & B. American Machine Co., has been elected president of E. W. Bliss Co., Detroit, succeeding **Marshall M. Smith,** who becomes a vice-president of E. W. Bliss Co., to be actively associated with the foreign business of the company.

• **H. L. Smith** has been appointed to the newly-created post of executive technical engineer, Federated Metals, division of American Smelting & Refining Co., with his headquarters in Pittsburgh.

• **John C. Wilson** has been elected a director and appointed vice-president in charge of sales of the Thompson Grinder Co., Springfield, Ohio. For the past 10 years Mr. Wilson has served as designer, chief draftsman, chief engineer and sales manager for the company.

COLOR has been added to PARK Nitrate Base Salts!

LOW TEMPERATURE DRAWING SALT
M.P.—275° F.; 115 lbs. per cu. ft.
Working Range—300° to 1100° F.

HIGH TEMPERATURE DRAWING SALT
M.P.—430° F.; 115 lbs. per cu. ft.
Working Range—480° to 1100° F.

PARK THERMO-QUENCH
M.P.—305° F.; 115 lbs. per cu. ft.
Working Range—350° to 1100° F.

PARK DRAW BLACK
M.P.—400° F.; 115 lbs. per cu. ft.
Working Range—450° to 1100° F.

PARK ALUMINUM SALTS
AL-1: M.P.—430° F.; 115 lbs. per cu. ft. Working Range —480° to 1100° F.
AL-2: M.P.—500° F.; 115 lbs. per cu. ft. Working Range —550° to 1100° F.

Provides quick visual identification, greater convenience and safety in use!

No chance now of mistaking Park Nitrate Base Salts for other salt compositions. No danger of unmindfully mixing them with Cyanide Base Salts or Neutral Salts. Because COLOR has been added! They're PINK! You can SEE the difference! Makes them more convenient to use. Provides greater safety in their use. And once the salts reach their melting point in the bath, the COLOR disappears completely... without effect on physical characteristics . . . without detracting in any way from Park's traditionally high standard of quality. Time-tested, proved. Acclaimed by major heat treaters the world around. See your Park representative . . . or write today for 36 page technical catalog-manual describing the complete line of Park "Laboratory Controlled" heat treating materials and factory aids.

● Liquid and Solid Carburizers ● Cyanide, Neutral, and High Speed Steel Salts ● Coke ● Lead Pot Carbon ● Charcoal ● No Carb ● Carbon Preventer ● Quenching and Tempering Oils ● Drawing Salts ● Metal Cleaners ● Kold-Grip Polishing Wheel Cement

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FRED L. FOX, assistant general manager of sales, Superior Steel Corp.

• **Fred L. Fox** has been appointed assistant general manager of sales, Superior Steel Corp., Carnegie, Pa. Mr. Fox has been Pittsburgh district sales manager since 1946. Previous to that he served as Superior's district sales manager in Chicago.

• **W. A. Fannin** has been advanced from manager of sales of the sheet and strip division of Weirton Steel Co., Weirton, W. Va., to assistant general manager of sales of all products. **F. G. Brown** has been promoted from assistant manager of the sheet and strip division to manager of that division.

• **Frank E. Swanson,** treasurer, director and one of the founders of the Gage Structural Steel Co., division of the Allied Structural Steel Companies, Chicago, has retired after 40 years. **R. H. Gage** has been elected president; **J. D. Gage,** vice-president, and **F. S. Saiger,** secretary-treasurer.

• **Nelson C. Walker** has been appointed district manager of the Berwick, Pa., plant of American Car & Foundry Co., New York. Mr. Walker, who served as assistant district manager of the Berwick plant, relieves **Justus W. Lehr,** who has been granted a leave of absence.

• **W. E. Comb** has been elected division vice-president of the Electro Metallurgical division, Union Carbide & Carbon Corp., New York. Mr. Comb joined Union Carbide in 1923 and since 1944 served as works manager. **A. L. Foscue** has been appointed works manager. Mr. Foscue joined the laboratory of the Niagara Falls plant of the Electro Metallurgical Co. in 1924. In 1946 he came to New York as assistant works manager, which position he held until his present appointment.

• **William C. Hipple,** who managed the Trenton, N. J., plant of the lamp division of Westinghouse Electric Corp., Pittsburgh, for almost 30 years, has retired. Mr. Hipple joined the Sawyer-Man Co., New York, forerunner of the lamp division, in 1902.

• **Leon E. Hoogstoel, John M. Cook** and **Ralph F. Gow** have been elected directors of the Behr-Manning Corp., Watervliet, N. Y.

• **William R. Moore** has been elected a director of Norton Co., Worcester, Mass. He currently serves as vice-president.

• **John R. Bartizal** has become executive vice-president of Clearing Machine Corp., Chicago. Mr. Bartizal has been associated with Clearing since 1945, when he became controller. He has been treasurer of the company since early last year.

• **Frank A. Mitchell,** formerly sales manager of the Deepfreeze Corp., has been named sales manager of the Unit Air Conditioner Div., Fedders-Quigan Corp., Buffalo. Mr. Mitchell succeeds **E. A. Bonneville,** who has resigned. **August F. Ihde,** sales manager of the Automotive division of Fedders-Quigan, has been elected vice-president in charge of sales of the division. **Anthony J. deFino** has been appointed sales manager, succeeding Mr. Ihde.

• **W. E. Tromanhauser,** Buffalo district manager of the Buffalo Fire Appliance Corp., Dayton, has been named sales manager. **Byron J. O'Hara,** formerly Michigan-Ohio district manager, succeeds Mr. Tromanhauser in Buffalo.

CHARLES M. DUNN, JR., assistant manager, Direct Sales Dept., Glidden Co.

• **Charles M. Dunn, Jr.,** has been named assistant manager, Direct Sales Dept., The Glidden Co., Cleveland. He continues as director of the technical service department. Mr. Dunn joined Glidden as a technical correspondent in the industrial sales division.

• **Fletcher W. Rockwell** has resigned as chairman and member of the board, National Lead Co., New York. Mr. Rockwell served as president of National Lead from 1938 to 1947 and has been succeeded in that capacity by **Joseph A. Martino.** Mr. Martino continues as chief executive officer and as chairman of the executive committee of the board of directors. Mr. Rockwell has had 53 years of continuous company service.

• **O. B. Wilson,** eastern regional sales manager for Brown Instruments division of Minneapolis-Honeywell Regulator Co., has been named manager of sales, with headquarters at the Brown plant in Philadelphia. Mr. Wilson, who has been with the industrial instruments division of Honeywell for the past 25 years, supervises sales in the area extending from Florida and the Gulf of Mexico to the Canadian border.

• **James R. Derrick** has been appointed assistant sales manager of the Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

• **Henry T. Chamberlain** has been elected president of Thompson-Bremer & Co., Chicago, succeeding **Arthur H. Thompson,** who has been elected chairman of the board of directors. **William J. Dunn** has been elected vice-president; **Joseph M. Griffen,** secretary, and **Walter M. Neuman,** comptroller. Mr. Dunn has for the past nine years been an executive of the Hydraulic division of New York Air Brake Co. in Chicago.

• **C. Hubert Lenhart** has become associated as vice-president with H. A. Brassert & Co., New York. He recently resigned as general superintendent, Kaiser Co., Inc., Fontana plant.

• **A. L. Carlson** has been named president, **L. R. O'Neill,** vice-president, and **H. A. Stix,** secretary and treasurer of the newly formed Carlso'n, Inc., Warren, Ohio. All were formerly associated with the Federal Machine & Welder Co.

• **C. J. Burnside,** who has been associated with radio and electronic activities of the Westinghouse Electric Corp., Pittsburgh, for the past 24 years, and who recently served as manager of the industrial electronics division, has resigned and organized an independent industrial consultant service, with headquarters in Baltimore. He continues his association with Westinghouse as a consultant.

• **F. W. Chambers** has been named manager of production for Koppers Engineering and Construction Div., Koppers Co., Inc., Pittsburgh. **O. H. Chambers** has been appointed assistant manager of production. **A. B. Fisher, Jr.,** has been made chief engineer of the division, succeeding **Ragnar Berg,** who becomes consulting engineer for that division. F. W. Chambers joined Koppers in 1927 and for the past year and a half has been working on a steel mill project in Chile, for which that company is consultant. O. H. Chambers joined the company in 1915 and has been serving as assistant chief engineer since 1936. Mr. Fisher has been with Koppers since 1926 and since early last year has been production engineer. Mr. Berg joined the company in 1915.

GILBERT J. LANGENDERFER, district industrial engineer, Surface Combustion Corp.

• **Gilbert J. Langenderfer** has been assigned as district industrial engineer in the Indiana territory to represent Surface Combustion Corp., Toledo. Mr. Langenderfer has been with the company 13 years, the last eight of which were spent as industrial engineer in the Chicago office. He replaces **Harry O. Bennett,** who has resigned to enter another field.

• **E. F. Tomlinson** has been made general manager of the newly-formed industrial and general products division of the B. F. Goodrich Co., Akron, Ohio. **Clyde D. DeLong** has been named manager of the plastic products sales department of that division near Marietta, Ohio. Mr. Tomlinson has been with Goodrich since 1927 and had been general manager of the industrial products sales division since 1943. Mr. DeLong has been with the company 21 years and had been merchandise manager of the industrial products sales division since 1946. **Donald W. Gates** has been appointed manager of advertising and sales promotion in the Associated Lines sales division of the company, succeeding **Jay E. Miller,** who has been named to the newly-created post of western public relations manager, with headquarters in Los Angeles. Mr. Gates has been with the company 10 years, Mr. Miller 13 years.

• **Alfred D. Caton** has been made assistant electrical engineer at the Bath Iron Works. He had formerly served as supervising electrical draftsman at the Fore River Yards of Bethlehem Steel Co., Inc.

• **Richard W. Tolstrup** has been appointed supervisor; **John J. Kirkiles,** foreman of the first shift, and **Albert L. Chalifour,** foreman on the second shift of the Screw Machine Products division of the Lynn River Works of General Electric Co.

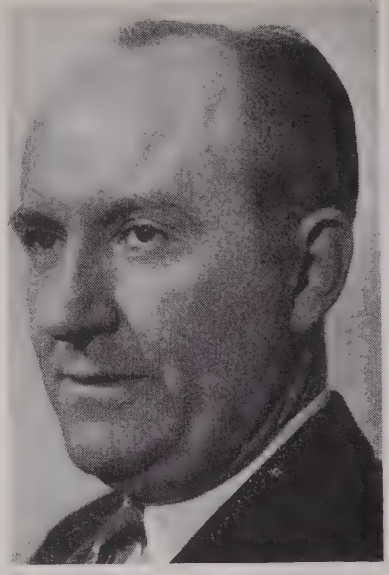
• **Charles G. Wistar** has been named works manager of the die-casting plant of the Aluminum Co. of America at Garwood, N. J. Mr. Wistar joined the company in 1937 as a metallurgist at the Garwood works. Previous to his promotion he had served as assistant works manager.

• **E. Bruce McEvoy, Jr.,** formerly assistant manager, eastern division, equipment tube sales, has been appointed east central manager of distributor sales for the Radio Tube Div., Sylvania Electric Products, Inc., New York.

• **Ray E. Markusen** has been promoted from publications editor to assistant advertising manager of the Pontiac Motor division, General Motors Corp., Pontiac, Mich. Mr. Markusen has been succeeded as publications editor by **Hugh V. Munce,** a former Detroit newspaper man.

• **David E. Killam, Jr.,** has been appointed to the New York staff, McKinsey & Co., New York. Mr. Killam had previously been associated with Thompson Products, Inc., and Westinghouse Electric Corp.

• **James F. Moore** has joined the Chicago sales department of Black & Decker Mfg. Co., Towson, Md., as sales engineer **T. J. Waters** succeeds Mr. Moore as service engineer at the Chicago branch. **W. E. Boyles,** formerly service engineer at the New Orleans branch, has been transferred to the Cleveland branch as sales engineer. **R. B. McClellan** has been named service engineer at New Orleans, succeeding Mr. Boyles. **Thomas Rogers** has been made sales engineer at the Dallas branch.



PAUL C. VAN CLEAVE (left), district manager, Los Angeles warehouse, and FRANK B. STEWART (right), district manager, San Francisco warehouse, U. S. Steel Supply Co., whose appointments were announced recently in THE IRON AGE.

• **James H. Cooper** has been elected vice-president in charge of engineering, McCord Corp., Detroit. Mr. Cooper joined the company in 1910 and in 1935 became works manager, continuing in that capacity until his new appointment. **Dean S. Fields** has been appointed works manager, succeeding Mr. Cooper. Mr. Fields joined McCord ten years ago.

• **Marshall G. Jones** has been made manager of local mines of the St. Joseph Lead Co., Gouverneur, N. Y. Mr. Jones formerly served as superintendent of the Baimat and Edwards mines. He succeeds **R. J. Mechin**, who has been promoted to assistant to the vice-president, with offices in New York.

• **H. R. Butts** has been made general sales manager in charge of the merchandising division of Electric Auto-Lite Co., Toledo, replacing **F. A. Nealon**, who has resigned. **D. M. Skirving**, who has been western division manager of the merchandising division since 1936, has been appointed to succeed Mr. Butts as sales manager, wire division, with headquarters in Port Huron, Mich. Before taking over the post of sales manager of the wire division last year, Mr. Butts served for 10 years as manager of the southern division of the merchandising division at Dallas. He has been with Auto-Lite 15 years.

• **E. J. Goett** has been appointed to head the sales development department and **M. N. DeNoyelles** has charge of the sales service department of Chas. Pfizer & Co., Inc., Brooklyn. **D. A. Hilton** heads the export department and **E. W. Whitney**, the advertising department. **R. H. Briggs** has been named manager of the newly-formed industrial sales division. **C. P. Walker** has been appointed head of the medicinal chemicals and antibiotics sales division. **R. G. von Bernuth**, formerly western sales manager, has been promoted to manager of the eastern sales region. **P. Weber** has been appointed acting manager of western sales region.

• **Roland S. Withers** has been appointed director of customer research section of General Motors distribution staff at Detroit, succeeding Henry G. Weaver, who died recently. Mr. Withers joined the customer research section of GM in 1933 and has served as assistant director of that section since 1944.

• **Frank E. Peterson** has recently been promoted to manager of the Milwaukee office of Wyandotte Chemicals Corp., Wyandotte, Mich. Mr. Peterson joined the organization in 1937 and was made assistant manager in Milwaukee last year. **Fred R. Hayden** has taken over the territory formerly covered by Mr. Peterson.

• **H. Arthur Howe** has been made manager of the Pittsfield phenolic products plant and the Coshocton, Ohio, varnish plant of the chemicals division of General Electric Co., Pittsfield, Mass. **Wyman Goss** has been appointed section engineer in charge of engineering on phenolic resins and compounds; **J. Rae Stirrat**, sales manager of phenolic products; **Nathen A. Freuden**, manager of sales planning; **Thomas J. O'Connell**, supervisor of costs, and **Arthur T. Bourgault**, phenolic products, accounting supervisor. **John A. Beals** and **Raymond E. Benedict** have been transferred from Schenectady to Pittsfield, the former as manager of sales administration and the latter as supervisor of payroll. **Alden K. McCollum** has been named manager of the laminated plastics plant at Coshocton, Ohio, succeeding Arthur C. Treece. Mr. McCollum had formerly served as head of G.E.'s Kokomo motor plant. **Kenneth J. Barlow** has been appointed manager of sales administration for the Plastics division of the company's chemical department. Mr. Barlow had been assistant to the manager of the company's Taunton plant for the past five years. **Harold G. Deters** has joined the chemicals division of the company's chemical department as assistant sales manager of alkyd resin products, with offices at Schenectady. He had formerly been associated with the Barrett Div., Allied Chemical & Dye Corp.

• **George Martin** and **Allen P. Wherry** have joined the service department of the Pemco Corp., Baltimore. Mr. Martin works out of the home office service department and Mr. Wherry has been appointed service engineer, covering the southern territory. **George G. Updike** has been assigned to the company's control laboratory. He had formerly been connected with Porcelain Products Corp. as assistant to the engineer of control.

• **Frank H. Stohr** has been named general manager of the Norwood Works of the Allis-Chalmers Mfg. Co., Milwaukee, succeeding **R. W. Davis**, who continues in an advisory capacity to the general manager. Mr. Stohr formerly served as executive vice-president and a director of the Elliott Co.

Where AIR Weighs More than Coal

In modern coal mines, for ventilating purposes alone, more tons of air are pumped in each day than tons of coal brought out!

To bring fresh air into mines and exhaust it again at the surface calls for a tremendous investment in construction and equipment—as the ventilating "overpass" shown here clearly indicates.

Blasted out of solid rock, roofed with steel beams and concrete slabs, it carries intake air over the mine haulage way which also serves as a giant exhaust duct.

Developments like this are typical of the improved conditions under which modern miners work . . . and indicate, too, the extent of the industry's billion-dollar, three-year mine modernization program.

Modern production facilities have come a long way—largely because of the mechanization program sponsored by progressive coal operators. Right now the industry is investing in new machines, new mines, and new preparation plants at a rate amounting to over a billion dollars in the next three years alone. Thanks to investments in new equipment and mining methods, today more than 91% of all bituminous coal mined underground is mechanically cut, and about 60% is mechanically loaded. Less than 3% is now mined by pick and shovel.

BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE

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WASHINGTON, D. C.

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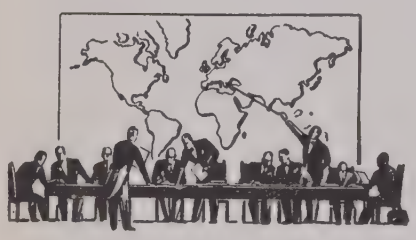
European Letter . . .

• Concrete issues test Russia's sincerity in peace moves . . . Veto an obstacle in reopening negotiations . . . Austrian Treaty discussions Russia's chance to demonstrate benign process of easing fear by conciliation.



LONDON—Mr. Stalin's peace offers are becoming almost irresistibly comic. At intervals, usually after the West has undergone particularly rough treatment at the hands of Soviet propagandists, some American journalist is summoned and out pops the Marshal, like the little figure on a child's weather house, to assure the world that all is sunshine after all. His latest performance is in keeping with the others. After a crescendo of abuse and attack, which included detailed denunciations from the Russian foreign office of the Atlantic Pact and Western Union (encirclement once again?) and an ominous puff of the bear's breath down Norway's neck (What, said the bear, are your intentions with regard to this encirclement?), Mr. Stalin issued to the International News Service his now familiar litany of question and answer. Would the Soviet government join the Americans in a declaration of peace? Of course. Would the Soviet participate in measures of disarmament? Naturally. Would they raise the blockade of Berlin if the western Powers were to postpone the creation of a west German state and reopen the German issue? Conditionally, yes. Would Stalin be ready to meet President Truman? "I have already stated that there are no objections to such a meeting." A day or so later, President Truman's lighthearted response that he would be happy to see Marshal Stalin in Washington at any time elicited another question from the obliging news service; and the Marshal replied that he regretted doctor's orders prevented him from taking long sea or air journeys, but he would be happy to meet the President anywhere in the Soviet sphere of influence.

THIS rigmarole, which closely resembles Stalin's two previous performances, is of little intrinsic interest. It disposes once and for all of the idea that technical difficulties on the Russian side are responsible for the blockade of Berlin, but nobody has ever believed that they were. What is of interest to the western Powers is Stalin's purpose in fishing with an unbaited hook, not the content of what he has said. The aim is quite clear. The Russians do not like the developments which the excesses of their policy have brought into being. They are disturbed by the rearmament of their more powerful neighbors. They wish to detach the United States from its close alliance with western Europe. They wish to halt, in particular, the development of western policy in Germany.

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Since, however, all these policies—rearmament, Atlantic alliance, the inclusion of a self-governing Germany in the western orbit—are designed to check an adventurous and expansive Russian policy, the fact that they have all struck home and that each has aroused Soviet apprehension clearly proves that the general concept of western strategy is correct and that the mixture of internal consolidation and external firmness is beginning to make itself felt. There should, therefore, be no inclination in western circles on either side of the Atlantic to modify one jot of their present grand strategy simply because Marshal Stalin has chosen to express his concern at its development. That this is the Allied view has been clearly demonstrated by Mr. Dean Acheson, who has officially announced his country's determination not to discuss the issues of peace except in collaboration with Britain and France. The Soviet attempt to drive a wedge between the Allies has thus been countered at once. But Mr. Acheson was not purely negative. He went on to point out that the western Powers were perfectly ready to discuss the problem of Germany once the preconditions of a conference, the lifting of the blockade, had been fulfilled.

THIS, surely is the core of the matter. The western Powers have strong reasons for not wishing to waive aside any genuine opportunity for reaching a settlement. One is the risk that war might break out between the world's two camps. Another is the passionate longing of the people of the world for peace. Marshal Stalin has chosen to express his policy in reply to questions which themselves were carefully designed to underline the Soviet Union's search for peace. By their critical comments on these replies, the western Powers must not seem to adopt the posture of opposing the very idea of a peaceful solution. It is true that the masses of Europe and America are must less gullible than they were in 1945, when they had yet to see how lasting and how appallingly oppressive Russia's incursions into Europe would be. But the longing for peace remains. It cannot be left to the Soviet side alone to voice it. There is, therefore, every wish in the west to seek agreement. The problem is the proper method to be adopted at this stage. The western Powers have had so many general demands for peace from the Russians already; it is on concrete points that negotiations always break down. Concrete issues must, therefore, be the test for judging whether a meeting of the heads of state is really worthwhile. Fortunately there are at the mo-

44,000,000

PHOENIX
ARIZ.

TUBES

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Modern mass production methods of the BB Pen Company of Hollywood, California, require ink cartridges held within strict dimensional tolerances: plus 0.0015″ minus 0.0000″ O.D.; plus 0.001″ minus 0.000″ I.D. Precision Tube Company has already supplied 44,261,000 brass tubes for these cartridges which, if laid end to end, would stretch from Philadelphia, Penna., to Philadelphia, Ariz., and every one identical within the specified tolerances.

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ment three perfectly clear and immediate issues upon which an assessment of Russian sincerity can be based.

In the first place, the question of disarmament can be taken up at the next General Assembly meeting in New York, at precisely the same point at which negotiations broke down last autumn when, after proposing an all-round reduction of one third in armaments, the Soviet Union stultified further discussion by refusing to disclose the size of its present forces. Nothing has changed since that time. If the Russians are in good faith, there is no reason why the negotiations should not be taken up again at their earlier point of breakdown.

In the second place, a report is about to be presented to the Powers representing the efforts of a neutral commission to find some way out of the currency dispute in Berlin. When this report is presented, the Russians will have the opportunity of cancelling the veto with which, in the Security Council last autumn, they rejected a compromise approach to the problem of Berlin—a compromise to which the western Powers and the six neutral members of the Security Council had all agreed. At this moment, only the Russian veto stands in the way of a formula for reopening negotiations on Berlin and even Germany; the normal machinery of the Security Council is waiting to be used.

THE last test is in some ways the most interesting of all since it gathers together a large number of specific points of agreement and disagreement; it is therefore a remarkably effective test of the extent and honesty of Russia's desire for peace. When the deputies of the Four Foreign Ministers reopen their talks on the Austrian Treaty, here surely is Russia's supreme chance to show that its peace offers imply genuine negotiation and genuine compromise and are not so much sand thrown in the wheels of western cooperation.

The issues outstanding in the Austrian Treaty are not so great that good will and the spirit of conciliation cannot settle them. The western Powers have gone very far in meeting Russia's economic demands, virtually to the point of giving Russia a predominant position in the Austrian economy. The main stumbling blocks when negotiations broke down in May, 1948, were, on the one hand, Soviet support for Tito's claim to Carinthia and parts of Styria and on the other, a narrow balance of disagreement on the sum to be paid to Russia in lieu of German assets and the precise proportion of Soviet exploitation of the oilfields—a dispute aggravated by the Russians' failure to produce plans and maps of the areas they wished to keep. The breach between Tito and the Cominform is likely to have altered the Soviet attitude towards the former obstacle; a very little good will should be sufficient to surmount the latter. If, therefore, the Soviet Government is sincere in its desire to end the vicious spiral of mounting fear and counter-defense and start the benign process of easing fear by conciliation, it is here in the small, precisely defined field of the Austrian peace treaty that a start can be made.

TO say so much is not to deny the infinitely greater difficulties that stand in the way of wider agreement, particularly of agreement over Germany. But no settlement at all can be reached by way of general declarations and lavish but hollow declarations of peaceful intent. It is one of the tragedies of Soviet policy that its propaganda has emptied the great words of humanity — democracy, brotherhood, patriotism, peace — of practically all their meaning. The only way now in which confidence in Soviet intentions can be revived is by modest, concrete, painstaking efforts to restore, step by step, point by point, treaty by treaty, some meaning to these much abused terms. Meanwhile, until Russian sincerity has genuinely passed the test, the western Powers will continue undisturbed in their own efforts to consolidate the security and expand the prosperity of the "western half."

IN THE MILLIONS: *The E. S. MacDonald Co. of Montreal has turned out over 1 million aluminum cans by using inert arc welders. Here workmen are shown adjusting the electrode holder and travel carriage for making the longitudinal seam weld on cans.*

Forms Equipment Division

Pittsburgh

• • • **Keystone Driller Co.** of Pittsburgh, machinery manufacturers, has announced that they have formed a new department to be known as the Equipment Div. They have acquired the services of Robert H. Fox and Associates of Van Nuys, Calif., to direct the engineering and marketing of their line of industrial equipment.

Keystone has contracted for the exclusive manufacturing rights to all designs and products of the Fox organization, designers and engineers of crane carriages up to 100 ton capacity.

Keystone's first offering will be a 15 to 25 ton capacity self propelled one man crane carriage or wagon on pneumatic tires for all makes of cranes. All retail sales will be through the Associated Equipment Distributer membership with few exceptions.

Celebrates 25th Year

Detroit

• • • **Commemorating** its 25th Anniversary, Chrysler Div. of Chrysler Corp. will hold a series of seven dealer meetings beginning Feb. 4 and concluding March 3 to introduce its new 1949 line of cars.

In addition to the new cars, it is planned to dramatize many of the engineering advances pioneered by Chrysler, including hydraulic brakes, high compression engines, floating power, fluid drive, superfinished working parts and other examples.

Joseph A. O'Malley, general sales manager of the Chrysler Div. will preside at all meetings.

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Extra strength, pressure-tightness and wear-resistance characterize major castings in this "Hydrolair" press . . .

Moreover, these properties may be secured whenever needed in cast parts by producing them in nickel alloy irons.

To meet a tensile strength specification of 50,000 p.s.i. minimum, Lindgren Foundry Company, Batavia, Ill., casts heads, cylinder bases, platens and intensifiers for "Hydrolairs," of a composition including 1.50% nickel and 0.50% chromium.

Along with essential strength, this type of nickel-chromium cast iron provides a dense, close-grained structure that remains free from leaks or pressure losses even though hydraulic stresses run high.

Write for our recommendations regarding the best nickel alloyed irons or steels for your applications.

Elmes Engineering Works of American Steel Foundries, Chicago, Ill., build "Hydrolairs" to provide small-press users with equipment for fast, economical operation. Floor and bench type models of 20, 30 and 50 ton capacity are available.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

• **STAINLESS TUBING**—National Tube Co. last week announced some minor revisions in extra charges on stainless seamless steel tubing. Extras on small quantities were increased while those on special analyses were reduced. The net effects of the revisions, based on current order volume, means no increase in profit to the company. Primary purpose of the change is to give the distributor a little more profit, because of his small-lot volume. Special analysis extras were cut by 1 pct. Quantity extras were increased from 80 to 100 pct on quantities of 75 lb or ft and less, with the increases dropping down to a boost from 5 to 7½ pct in the 1250 to 3749 lb or ft bracket.

• **EXTENDS VOLUNTARY PLAN**—President Truman signed into law this week legislation (S. 547) extending voluntary allocation plans for 7 months. The Commerce Dept. now is authorized to sponsor voluntary rationing programs through Sept. 30, 1949. Congressional leaders feel that this new lease on the life of the Republican-sponsored program will give them ample time to study the supply-and-demand situation with regard to steel. Meanwhile, the White House continues to push for compulsory allocation authority on a standby basis.

• **SCRAP COMPOSITE OFF**—THE IRON AGE scrap composite dropped $2.84 a gross ton to $37.58 a gross ton on the basis of a $4.50 drop in the price of No. 1 heavy melting steel scrap in Chicago and $2 declines in the price of the same item at Philadelphia and Pittsburgh. The composite is based on the average price of No. 1 heavy melting steel scrap quoted to consumers at Pittsburgh, Chicago and Philadelphia.

• **TEST F. O. B.**—Two small makers of mechanical welded tubing, one in Michigan the other in Ohio, recently revised their prices. Both equalized the freight charges so that delivered prices exactly match Chicago producers' delivered price in Chicago. Thus their mill nets differ depending on where they ship.

• **INVENTORIES DROP**—Many consumers are running their steel inventories down to the point where they will be gasping for tonnage by May or June, according to steel sales executives. On the other hand, gray market operators who are a principal outlet for such tonnage have been unloading some of their stocks at a loss.

• **GEAR SALES UP**—Gear sales for December of last year were up 5.47 pct over the preceding month, according to the American Gear Manufacturers' Assn. The new index figure for December is 325.9, based on 100 for 1935 to 1939.

• **FREIGHT CARS**—Freight car orders received during January by carbuilders and railroad shops totaled only 1568 cars. Of these, the carbuilders booked 1393 and the railroad shops 175. Of the January total, 1000 were stock orders put on the books by Pullman Standard and some have already been sold. Domestic car deliveries in January totaled 8913, of which 6130 were from carbuilders and 2783 from captive shops. Feb. 1 backlogs, at a new low, were: carbuilders, 59,984; railroad shops, 36,230.

• **PIG IRON EASING**—Offerings of pig iron in the eastern market are growing. Tonawanda iron, all of which has been taken up by American Radiator Co. for the last several years, is now being offered in the Philadelphia market. The Chester furnace, now in production at the rate of about 200 tons a day, is also offering iron. The furnace of the Tennessee Products Co. is now offering 10,000 tons a month. The Mystic furnace is producing at the rate of 525 tons a day.

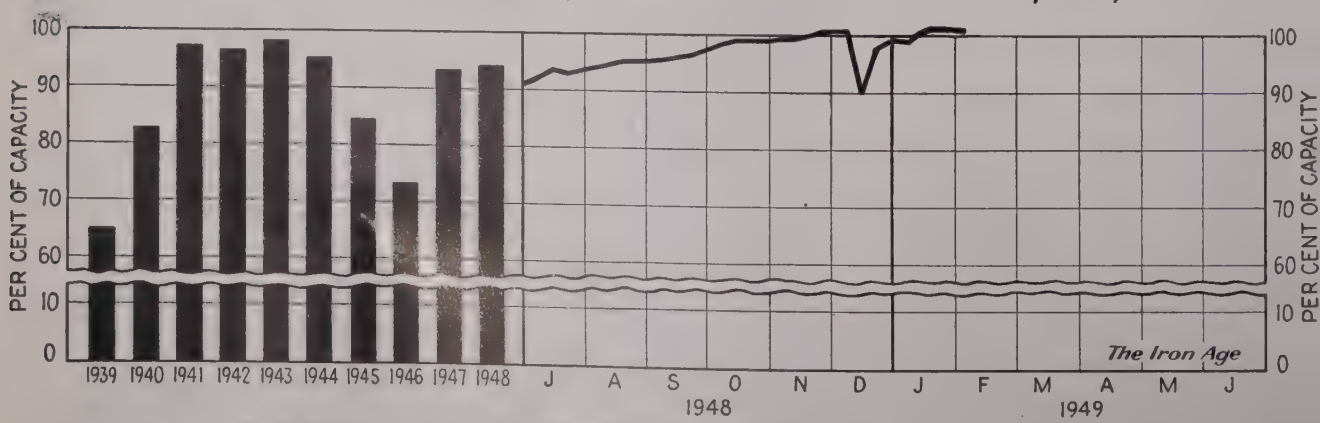
• **MORATORIUM ASKED**—Legislation declaring a moratorium on antitrust laws applying to delivered price systems is under consideration in Washington. The House Judiciary Committee is now discussing a bill (H. R. 2222) introduced by Representative Walter, D., Pa., which would provide a 2-year moratorium with respect to the application of certain antitrust laws to individual, good-faith delivered price systems and freight absorption practices. The committee has not yet scheduled hearings on the Walter proposal.

• **LAYOFF**—The East Buffalo car shops of the New York Central R. R. has laid off 96 of its 768 workers in what appeared to be an economy move. Freight traffic in January was off about 20 pct from the same month of 1948. Early February has shown a drop of approximately 30 pct from a year ago.

• **JANUARY RECORD**—Despite holiday shutdowns, Britain's iron and steel industry operated at a January all-time record level to turn out 1,430,959 tons of ingots and 883,376 tons of pig iron. This is at an annual rate of 16.8 million tons of steel and 10.4 million tons of pig iron.

• **NEW LINE**—Hotpoint Inc. in Chicago will soon start production of their completely automatic clothes washer. Manufacturing will take place in part of the old electric range plant in Chicago. They expect to make about 75,000 units this year.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 1.....	101.5	100.0	94.0	100.0	101.0	105.0	100.5	102.0	105.0*	101.0	107.0	84.5	108.5	101.0
February 8.....	101.0	101.0	94.0	101.0	100.0	105 0	100.0	103.0	102.0	102.5	107.0	89.5	112.5	100.5

* Revised.

Industrial News Summary

- **Steel Users Become Price Conscious**
- **Conversion Deals Now on the Wane**
- **Scrap Composite Drops $2.84 a Ton**

FURTHER proof that the steel market was trending to a more normal condition is found this week in the automobile field. In the auto center there was (1) Less pressure on steel mill offices; (2) most steel buyers there were getting their full quotas; (3) some buyers were being offered hand mill products at less than former "premium" prices and (4) more consumers were getting bonus tonnages from mills—tonnages which arise quickly on mill schedules because of isolated cancellations by other users.

But it was still true that auto firms were taking all the steel they could get and showed no signs of cancelling tonnage. But the contrast to steel market conditions in Detroit this week to what they were only 6 months ago is enough evidence to say that things are rolling toward normal—faster than had been expected.

For the first time since the end of the war steel customers are super price conscious. With the gray market a dead dodo, many steel users are trying to eliminate as quickly as possible high cost conversion deals—plans which call for buying high priced ingots at one place and having them converted into finished steel products at another plant.

Some steel consumers have iron clad contracts for high priced conversion steel which run for a long period. In those cases the customer can't do much. If mill steel supplies become as easy as expected by the middle of the year, some steel users will be stuck with high cost conversion contracts.

But not all users of conversion steel have such contracts. Many are already turning down offers of ingots and relying on regular mill sources for their steel. They are also reducing their inventory, hoping this will tide them over until steel becomes easier to get. Others who had been buying high priced ingots are shopping around to get them at a lower price—and many have been successful.

THE pattern in the steel market this week as it works its way to a normal condition is clear. It is: (1) Acceptance that gray market steel is out of the picture except for emergency uses—which are becoming less frequent; (2) elimination as quickly as possible of conversion deals; (3) avoidance of premium priced steel and (4) reliance as far as possible on regular mill shipments.

So far this is only the beginning of the steel consumers' fight to get back on a "regular" footing. But the pressure will grow on steel companies as some of their customers toss their high cost gimmicks out the window. Now the watchword is quality, competition and salesmanship. In order to make all three of these factors work out, steel users must cut their costs. If they can get out from under high priced conversion deals and completely stop trading in the gray market —as most of them have done—they can get their unit cost of manufacturing down to some extent.

But the day of easy steel which would take care of a lot of manufacturers' worries is still not yet here. It looks this week as if most of the larger conversion plans will hold up until summer. It also looks like the auto companies and the oil people have quite a few contracts for steel at higher prices which will turn into a white elephant before the year is out.

ONE major factor of the metal market which must still be appraised is the return of seasonal factors. Many appliance and auto people are now ordering steel for equipment which will go on sale at a time when seasonal factors should dictate heavier consumption. If these expectations are not realized, there will be a reaction in the steel market—and a revision of buying plans.

Biggest news in the steel market this week is a sharp drop in the price of scrap at Chicago, Pittsburgh and Philadelphia. In Chicago the price of No. 1 heavy melting steel is down $4.50 a gross ton. The decline at Philadelphia and Pittsburgh is $2 a ton.

Because of these declines THE IRON AGE steel scrap composite has dropped $2.84 a gross ton to $37.58 a gross ton. This is the lowest price since the summer of 1947. It is clear that part of the drop in scrap prices in all markets is discounting a less active steel market later this year.

The steel ingot rate this week is off only half a point to 100.5 pct of rated capacity. For the fourth straight week steel has been pouring out of steel centers at an annual rate of 97 million tons. There is nothing in the picture to expect any change in the rate for some months.

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STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNE

Government Still Owns About $150 Million of Steel Facilities

Plants Sold Returned 35¢ On Invested Dollar; Double Other Surplus Sales

o o o

By KARL RANNELLS
Washington Bureau

o o o

Washington

• • • **Uncle Sam doesn't** need any new, enabling legislation in order to get into the steel business. He's already in it.

Regardless of the outcome of current proposals for federal construction and/or financing of new capacity, the government's holdings of steel and other related properties still looms large—even compared with the huge investment of any one of a number of the larger steel corporations. These holdings range from coke ovens to almost complete steel mills.

As of the beginning of 1949, the government still has between $125 million and $150 million tied up in such properties. They consist of former war plants which have been farmed out for peacetime operation under long-term leases ranging from 5 to 20 years.

The rated wartime capacities of these combined rental properties total 1.3 million tons of coke, 1.4 million tons of pig iron, and upwards of a million tons of open-hearth ingots. Finishing facilities include capacities for 400,000 tons of plate, while blooming mills combine to a total of about 450,000 tons. Other facilities under lease include casting and forging tonnage of more than 100,000 tons.

The government holdings, however, are now relatively small when compared with late 1945. At that time, the end of the war, the government found itself with a total of 149 steel-making and related properties on its hands. The acquisition cost amounted to about $925 million or a fifth as much as the total private investment of the steel industry at the same time.

The government's investments at that time included 52 integrated, semi-integrated and independent steel plants which had cost it about $638 million to build at wartime and government contract prices.

In addition, it owned 50 foundries, costing another $138 million; 16 forging plants costing $68 million; five blast furnaces involving $55 million, and a varied lot of related properties such as mines, refractory and flux plants, ferroalloy projects, and others.

Other than for the plants under long-term leases, the government has divested itself by outright sale of all its steel plants except facilities at Warren, Ohio, which were operated during the war by Copperweld. War Assets Administration is currently engaged in trying to negotiate a sale for this $19-million property.

Likewise, all blast furnaces and mining properties have been sold. But WAA still has about a dozen plants, mostly foundries, for which it would like to find buyers.

In addition to the latter inventory, the government owns and operates through leases—and will continue to do so for years to come—a full score of major metal properties, including 10 steel plants as such. First of these leases will not come up for re-

Here He Comes!

SURPLUS IRON AND STEEL FACILITIES UNDER LEASE

Lessee and War Purpose	Estimated Wartime Capacity	Original Cost
Integrated, Semi-integrated, and Independent Steel-producing Facilities		
Granite City Steel Co.,		$12,697,000
Granite City, Ill.		
Open hearth ingots	390,000	
Plate finishing	190,000	
Republic Steel Corp.,		12,113,000
Gadsen, Ala.		
Open hearth ingots	120,000	
Pig iron	280,000	
Coke	328,000	
Republic, Cleveland, Ohio.		28,053,000
Open hearth ingots	120,000	
Pig iron	450,000	
Coke	395,000	
Republic, Warren, Ohio.		1,036,000
Sintering facilities	392,000	
Coke	325,000	
Republic, Youngstown, Ohio.		9,188,000
Open hearth ingots	220,000	
Pig iron	392,000	
Sintering	392,000	
Republic, Birmingham, Ala.		116,000
Coal washing	48,000	
Republic, Warren, Ohio.		964,000
Sponge iron	35,000	
American Rolling Mill Co., Hamilton, Ohio.		777,000
Ore reduction	540,000	
Jessop Steel Co., Washington, Pa.		1,569,000
Electric tool steel	25,000	
Sheffield Steel Corp., Houston, Texas.	(est.)	12,000 000
Blooming mill	447,000	
Plate mill	217,000	
Malleable and Gray Iron Foundries		
Albion Malleable Iron Co., Albion, Mich.		1,883,000
Castings	25,000	
Auto Specialties Mfg. Co., Benton Harbor, Mich.		3,700,000
Castings	10,700	
Crucible Steel Castings Co., Milwaukee, Wisc.		2,040,000
Castings	9,000	
Batavia Metal Products, Inc., Centerville, Iowa.		165,000
Castings	2,400	
Lehigh Foundries Corp., Easton, Pa.		.....
Castings	2,700	
Ohio Steel Foundry Co., Lima, Ohio.		3,727,000
Castings	7,200	
Pacific Chain & Mfg. Co., Portland, Ore.		354 000
Castings	1,500	
Unitcast Corp., Toledo, Ohio.		3,820,000
Castings	7,400	
Forging Facilities		
Canton Drop Forge Co., Canton, Ohio.		$3,100,000
Drop and upset	2,000	
Utica Drop Forge & Tool Co., Utica, N. Y.		701,000
Plane part forgings	.....	
United Engineering & Foundry Co., New Castle, Pa.		25,100,000
Finished forgings	6,000	
Steel castings	36,000	

Table compiled by THE IRON AGE from information supplied by War Assets Administration. It must be kept in mind that current actual production figures may vary somewhat from rated wartime capacity, quoted above, because of the peacetime uses to which the lessees may have applied the facilities. Also, the above cost figures may include facilities other than those involving the above capacity ratings.

newal until about 1952 and some may run until 1968.

Summarizing briefly, Republic is operating, by lease, steel properties in Cleveland, Warren, and Gadsen; Sheffield, facilities in and around Houston, and Granite City Steel has leased government works in Granite City.

Of its malleable and gray iron foundry holdings, the government has sold 31 and let out eight others on long-term leases. Rated capacity of the leased facilities amounts to around 65,000 tons. The remaining plants are still held as inventory.

The WAA is due to pass out of existence on March 1 and dump the whole problem of administering the leases, as well as disposal of real property inventories, into the lap of the Reconstruction Finance Corp.

Handling of the steel properties will make up a relatively small portion of the headache being handed to RFC under the terms of last year's legislation. All in all, the agency will inherit from WAA about $2.1 billion in real property.

About $750 million of the overall total is tied up in long-term leases—of which about 20 pct involves steel and related facilities. The remaining inventory of $1.45 billion includes perhaps as much as $60 million in metalworking property, or less than 5 pct.

The RFC takes over its new duties reluctantly. But if White House proposals are followed by Congress, it may be only a temporary stewardship. In his budget message, President Truman recommended that Congress set up a Central Property Management Agency.

The new bureau would take over the job of administration of leases as well as the responsibility for maintenance and disposals of surplus property. It was recommended that $15 million be appropriated for this purpose for fiscal 1949 and another $21 million next year.

As a whole, the record of WAA and its predecessor agencies in disposing of steel and related facilities has not been too bad when compared with other groupings—even other types of war plants.

Through Nov. 15, latest offiial figures, a return of 35¢ on the dollar had been obtained through the sale of 105 of the original 149 steel properties.

Steel properties having an acquisition cost of $652 million had been sold for $231 million. Some 23 properties having an original cost of $132 million had been leased.

SURPLUS IRON AND STEEL FACILITIES DISPOSED OF BY SALE

	Acquisition Cost	Sales Realization	Pct Return
GROUP A— Integrated, Semi-Integrated and Non-Integrated Steel Plants	$498,169,732	$185,916,206	37.3
GROUP B— Iron Ore Mines & Facilities	853,491	200,000	23.4
GROUP C— Refractory and Flux Plants	2,056,751	1,116,100	54.2
GROUP D— Blast Furnaces	55,427,714	12,835,648	23.1
GROUP E— Independent Coal and Coke Plants	3,080,163	840,000	25.8
GROUP F— Iron and Steel Scrap Projects	129,663	82,750	65.6
GROUP G— Steel, Gray Iron & Malleable Iron Foundries	44,136,741	14,453,157	32.8
GROUP H— Steel Forging Plants	29,629,139	7,521,827	25.6
GROUP I— Ferro Alloy Projects	15,111,395	7,393,198	48.3
GROUP J— Miscellaneous Plants	3,680,182	1,074,183	30.5
TOTAL	$652,275,011	$230,433,069	32.5

U. S. Shipbuilding Approaches A Crisis

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By STEVE SMOKE
Associate Editor

o o o

The S. S. Exochorda and S. S. Excambion virtually end major postwar conversions

o o o

New York

• • • **Everything looks good** in the shipbuilding industry—on the surface. The American Bureau of Shipping reports that our current merchant fleet compares favorably with its prewar counterpart. (Table I.) The Shipbuilders Council of America reports over twice as many ships on order or under construction on Jan. 1, 1949, as there were a year ago.

But behind all this, the industry is doomed for the same fate it experienced from 1922 until 1937 unless proposals submitted by the President's Advisory Committee are heeded.

Everything on the fire now points to 1950 (Table II.). Of the 78 vessels or 1,315,102 gross tons of shipping in view, 65 or 1,089,000 tons consist of tankers. They constitute a good stop-gap. They also typify the unbalance of current shipbuilding activity. Although their construction will afford a good volume of business and employment, their program is comparatively short in duration. Delivery schedules call for their completion in 2 years. After that demand for their construction will probably be limited.

After the war, President Truman saw the dilemma which faced the industry. He appointed an Advisory Committee to look into the situation and make recommendations. They did. In November 1947 they issued a report which looks better by the day. They recommended:

(1) An extensive freighter and tanker program;

(2) Construction of 46 passenger and passenger-cargo vessels to bring our passenger fleet to at least its prewar level;

(3) A uniform replenishment program of about 50 ships a year to keep our merchant fleet young and at about 1000 ships; and

(4) Maintain a minimum employment of 60,000 in the shipbuilding industry. On an average this would mean about 42,000 on privately owned vessel construction.

These recommendations were made primarily with national security in view.

Although shipbuilding men generally agree that the recommendations made by the Committee are accurate, no Presidential action has been taken on their proposals. Here's what has actually happened since then.

Our merchant fleet does number over 1000 ships. It should, chiefly because of the tremendous wartime building program. Orders have been placed for a good volume of tanker business. They are all legitimate. But reliable sources point out that some could be canceled. Work on over half has not yet begun. One shipyard has waited for over 4 months to get steel to start construction on 6 vessels. The longer they wait—the more fearful they become of cancellations. However, the orders are still there.

At the end of last year, 17 American steamship companies were operating only 52 passenger ships with a capacity of barely 13,000 passengers. This is quite a contrast with 1939 when 25 lines operated 113 ships with accommodations for 38,000 persons. Moreover, only one of our current steamships is a first-class passenger liner.

Of the 46 passenger and passenger cargo vessels which the Committee recommended, to date contracts have been placed for only two passenger and three passenger cargo vessels. Bids have been received and are now under consideration for a 48,000 ton superliner to rival the speed of the Queen Mary. It takes about 3½ years to build such a ship. Unless new business develops here in the near future, the outlook for the shipbuilding yards will be gloomier than at any time since the enactment of the Merchant Marine Act of 1936.

There should be a replenishment of the current fleet, the Committee figures—about 50 ships a year. We don't have anything like that on the books. As long as we don't, we're heading for a dead-end street, they feel.

When it comes to employment prospects, we're in the same boat. At the end of last year we had only about 25,000 men employed in new construction. Early in the year we had about 57,000 employed in repair work. During the last half of the year it fell off rapidly.

D. D. Strohmeier, vice-president in charge of the Shipbuilding Div. of the Bethlehem Steel Co., attributes the slump primarily to: (1) virtual completion of postwar

Industrial Briefs . . .

• ACQUISITION—Gray Marine Motor Co., Detroit, has sold its United Brass & Aluminum Co. plant at Port Huron to Paul Weiner of the Weiner Foundry Co., Muskegon, it has been announced. The local plant will be dismantled, with some of the equipment being moved to Muskegon and the remainder being scrapped or sold.

• ELECTS OFFICERS—R. S. Reynolds, Jr., of the Reynolds Metals Co., Richmond, Va., has been elected president of the Aluminum Assn. Vice-presidents are: E. G. Grundstrom, Advance Aluminum Castings Corp., Chicago; M. E. Rosenthal, United Smelting & Aluminum Co., Inc., New Haven, Conn.; and George N. Wright, the John Harsch Bronze & Foundry Co., Cleveland. A. V. Davis, Aluminum Co. of America, New York, was reelected chairman of the board, and Donald M. White secretary and treasurer.

• MACHINERY AGENTS—C. R. Terry, formerly sales engineer for the Hydraulic Press Mfg. Co., has organized the Terry Machinery Co., Hanna Bldg., Cleveland. He and associates will represent a limited number of machine tool and metalworking equipment manufacturers throughout northeastern Ohio.

• NEW SERVICE—The Wilkie Die Products Co., Grosse Pointe Woods, Mich., is offering a service for locating surplus forging and die sinking material and equipment. A weekly bulletin lists the location, condition and prices of available forging material and equipment.

• EXPANDING—Southern States Iron Roofing Co., Savannah, has announced plans for opening a branch-warehouse in New Orleans in the early spring. The factory division will manufacture aluminum and steel roofing and accessories. It will be the company's principal export outlet to South and Central America.

• INDUSTRIAL OVENS — Announcement has been made of the formation of the Michigan Oven Co. at 4544 Grand River Ave., Detroit. They will design, fabricate and distribute industrial ovens of all types for operating temperatures to 1100° F. The officers of the new company are R. J. Ruff, president; E. C. Herrington, vice-president and treasurer, and Paul A. Meyer, secretary.

• MOVES—Announcement has been made that the sales offices of the Sight Feed Generator Co., located at Richmond, Ind., will be moved to the factory at West Alexandria, Ohio, about Mar. 1.

• NORTHWESTERN AGENT—Marcus Transformer Co., Inc., Hillside, N. J., has announced the appointment of the W. R. Hendrey Co., Smith Tower, Seattle, as their territorial repesentative for the states of Washington and Oregon.

• OPENS BRANCH OFFICE—Miles Metal Corp., New York, metal brokers, has announced that they are opening a Detroit office at 1010 Stephenson Bldg., 6560 Cass Ave., which will be managed by Lester T. Neiman.

• REPRESENTATIVES—Steel City Testing Machines, Inc., Detroit, manufacturer of machines for the physical testing of metals, has announced the appointment of two sales representatives. J. W. Dice & Co., Grand View-on-Hudson, New York, will cover the Middle Atlantic area and Steel City Tool & Machinery Co., Inc., Pittsburgh, will cover western Pennsylvania, West Virginia and adjacent counties in Ohio.

• NEW PLANT—A new Chrysler-Amplex plant at 65th and Harper Ave., Detroit, has recently been completed. It will produce Oilite heavy-duty, oil cushion bearings, finished machine parts, filters, friction units and bar stock.

TABLE I

American-Flag Merchant Fleet

(2000 gross tons and over)

Year	Ships	Tonnage
Merchant Fleet		
1949	1181	14,125,000*
1939	1150	10,500,000*
Passenger Vessels		
1949	52	528,124
1939	151	1,254,718
Tankers		
1949	474	4,479,919
1939	353	2,589,442
Dry Cargo		
1949	664	4,450,000
1939	662	3,208,939
Reserve Fleet		
1949	1966	Not Reported
	1395	Liberty Ships
	235	Victory Ships
	10	Liberty Type Tankers
	14	Coastal Tank Ships
	3	Prewar Tankers
	309	Chartered to Private Owners

*Deadweight tons

reconversion work, (2) continued shrinkage of the American merchant fleet (by about 400 vessels during 1948), and (3) reduction in the available work on foreign ships because of dollar-exchange restrictions and the rehabilitation of foreign shipyards.

The outlook for ship repair yards has been further confused by new uncertainties. Among these are (1) the ECA's threat that it may ignore the guarantees that at least 50 pct of the bulk cargoes exported under the Marshall plan be moved in American ships, and (2) the Maritime Commission's contemplated program to install and operate drydocks at the reserve fleet sites.

The ECA threat could serve as a blow to the merchant marine and result in a further contraction of our fleet. The Maritime Commission drydock plan would represent Governmental duplication of already existing private facilities.

Denial of such work to private yards, Mr. Strohmeier contends, could be a serious blow to the future of an industry which is so essential to our national defense.

TABLE II—Ship Deliveries

(2000 gross tons and over)

Year	Ships	Tonnage
1946	88	672,554
1947	50	286,473
1948	29	182,473
1949*	41	593,162
1950*	36	703,940
1951*	1	18,000

*Scheduled

Higher Quality Steels Are Easier; Same Signs Watched On Carbon Steel

Pittsburgh

• • • **Cancellations** and deferments of orders for carbon steel have not yet affected mill bookings, but the higher quality steel products have turned softer. Stainless, alloy and tool steel deliveries are shorter than they were a few months ago. These high-priced items turned soft at the beginning of 1948 but by June of that year their delivery dates were considerably extended.

In some steel circles it is felt that the same things that have just softened the high-priced steel market are also at work on carbon steel. But the process will take longer. Again as in 1948 the answer may not come before spring or early summer, but this time there are more people predicting better supply in carbon steel than there were in February 1948.

A reason advanced by the latter group is that more and more buyers are gearing their steel orders to their business prospects. This means to actual orders not prognostications. Today many buyers won't buy steel just because it's steel. They want to be sure they'll need it and they are becoming more price conscious. It is still far from a buyers' market in carbon steel. The question is: When is it coming? What are the signs to look for?

The automobile industry is still heavily committed through the first quarter for steel obtained through conversion arrangements. It is true there is a buyers' market now in all but the lower-priced cars. But the lower-priced cars consume most of the automotive steel. Therefore, this is one place to look for softness.

Among household appliance makers the big refrigerator manufacturers stand almost alone. They want all the steel they can get from the mills in the next few months because they are entering their selling season, the time when they must sell the bulk of their year's output or be in trouble.

The railroad freight car building program is losing steam at a howling rate. Only the railroads can revive it with more orders, but their buying has been puny because they're worried about another round of wage increases, higher taxes, truck competition and business conditions.

Only 63 pct of outstanding car orders are in independent car-building shops; the other 37 pct are in railroad shops. The capacity ratio of the two types of shops, however, is about 80 to 20. Therefore, railroad shop backlogs are long—2 years in some cases—while independent shop bookings are short—3 months in some cases. Result: lower immediate demand for plates, structurals and sheets.

These are just three straws in the wind. They won't positively prove anything until they light. By early summer several questions should be answered: (1) Will the higher-priced cars now piling up in dealers' garages and rented barns be sold? (2) Will the growing refrigerator stocks move into kitchens under sales pressure? (3) Will oil companies keep on buying steel at the present rate even if oil prices fall? (4) Are railroads going to step up their orders and barge builders book some business, and will the voluntary allocations programs take all the steel they are getting, etc.?

Meanwhile, some steel lines that are now soft will pick up. The railroads did not get all the rails they wanted last year. When they took year-end inventories they found an oversupply of spikes and other track accessories. So they cut back on these products. Power companies slowed down on pole line hardware orders because heavy equipment for their systems has been slow in coming in.

Buyers of cold-finished bars are getting a little more cautious, though the product is a long way from being in good supply. Cold finishers are still rationed on hot-rolled bars, so their finished product is still allocated. Six months ago any cold-finished bar producer could have booked his mill through 1949. Today, though supply promises to be very tight for some time, he might have trouble booking anything beyond June even if he elected to open his books for the whole year.

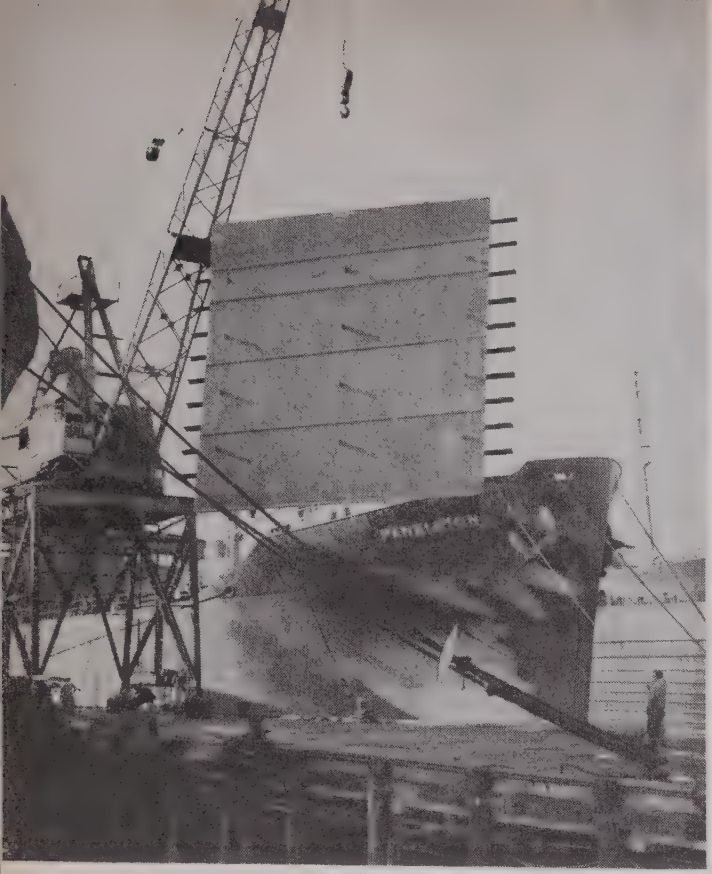
Tool steels can generally be had on 4 to 5 weeks' notice today. This was the delivery picture in January 1948, too. By May of that year it had doubled to 8 to 10 weeks, a situation that held on well through the year.

Small sections in alloy steel are very tight still. Some mills can offer nothing in less than 30 weeks. Alloy rounds in large diameters (up to 8 in.) are booked into June by one of the major producers. Openhearth alloys can generally be bought now for April delivery. Electric furnace alloys are on a 4 to 5 week basis at most mills—just half what they were a few months ago. So far, this duplicates the delivery picture early in 1948.

Stainless strip orders are being taken now for April delivery. This item was on a 2-month delivery basis early last year, but by June it was extended to 3 to 4 months. Stainless sheets, which ranged up to 10-week delivery toward the end of 1948, are now offered in 4 to 5 weeks by several mills. If sheet bars are in stock this can be cut to 3 to 4 weeks. One company, with a little heavier backlog, is quoting 7 weeks. Last February, 4 to 5 weeks was the stainless sheet delivery pattern.

QUICK AND COMMON: *Hand filing is commonly used in finishing up the surface of dies and bringing them within size tolerance. Here a worker is shown working on one at Fisher Body's Die and Machine plant.*

Port Plays an Important Part



DOWN IN MOBILE: *The Alabama Drydock & Shipbuilding Co. repairs a lot of tankers. Here a prefabricated bulkhead is being hoisted aboard a Standard Oil tanker, part of a job that took 700 tons of plates and structural shapes. Mobile's shipyard now employs about 11,000 workers.*

Mobile

• • • **Mobile's prosperity** lacks the black-gold gleam of the oil cities to the west but it seems to have a certain soundness about it. Anything can happen to plans and prognostications but its growth appears to rest on a firm foundation, thanks to pulp and paper, chemicals and the port. Establishment of a few new industries and expansion of many existing plants is giving the city a new outlook.

Mobile is determined to get its share—and perhaps a little more—of the industrial development in the new South. "Boom" would be too flashy a word—it is more akin to a moderate, steady growth. On it there is the usual veneer as store fronts get face liftings and industrialists try to out-Cadillac each other.

Shipbuilding boomed Mobile during the war—and could do so again. But, unlike New Orleans, which consolidated its wartime gains, Mobile had to sluff off thousands of workers when peace came. According to the chamber of commerce, this is not an unmixed blessing. It created a labor pool for new or expanded industry.

World War II earned for Mobile the dubious distinction of being America's fastest growing city when its population rocketed from 115,000 to 230,000. The working force jumped from 40,000 to 110,000. Now it's down to about 65,000 and population, says the chamber of commerce, is approximately 200,000. Its shipbuilding companies employ about 8000 workers, 43,000 less than the wartime peak but 5000 above the prewar average. Some 370 more are employed in other metal fabricating shops and 200 in the machinery field.

Alabama Dry Dock & Shipbuilding Co., with two yards, and Gulf Shipbuilding Corp., a Waterman Steamship Corp. subsidiary, with one, are the city's big steel users. Waterman also converts baby flat tops for peacetime use at one of the state docks. Alabama Dry Dock & Shipbuilding Co., which built more than a hundred T-2 tankers during the war, hasn't built anything big since. It concentrates on repair and conversion work, builds some barges and smaller boats. Alabama will probably go back into big ship construction if it ever feels that that's a fair long term proposition. Meanwhile repair jobs require a lot of steel. Example: 700 tons of plates and structurals are needed to replace a big tanker's bulkheads—a job that has to be done every 8 years or so if the vessel carries gasoline. Alabama gets the steel for this work under the tanker section of the voluntary allocations program. It also receives 200 tons a month under the barge building and repair section of that program. These tonnages are, of course, in addition to steel for other construction and repair work.

Alabama's president, John M. Griser, told THE IRON AGE that he will go after more barge steel. "We could use 200 tons a week in barge building," he said, "and we are about ready to close some firm orders and pick up some of these allocations the other builders are not able to take." Mr. Griser was referring to a recent Office of Defense Transportation letter which disclosed that several barge builders, lacking firm orders, were unable to take the steel now allocated to them.

The yard had a 6-week strike in 1946 and no labor trouble since. "Our labor relations are getting better all the time," said Mr. Griser. He had a good word for TC & I, too. "They start by saying they don't know where they are going to get the steel," he explained, "but somehow they manage to find it—or at least some of it." This doesn't mean he is getting all the steel he wants. But this shipbuilder, like most steel users, knows that when the day comes that he can get all the steel he wants he won't need it all.

Mobile Steel Co., structural fabricator, is with the majority—those who could use more structural shapes. It has had to turn down business for lack of them. Wide-flange beams, not rolled at Birmingham, are a particular headache to southern fabricators. They are hard to get in quantity from the northern mills and some jobs can only be completed by picking them up wherever they can be found. This generally means up north at a fancy price and a fine fat freight rate.

The city and the state are extraordinarily proud of the Alabama State Docks at Mobile. The

In Industrial Growth of Mobile

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

setup is said to be one of the most efficient seaport terminals in the country. They'll handls 22 ocean going freighters at once and berth space for 16 more is being added. Besides the usual port facilities the docks include the Gulf Coast's largest bulk materials handling plant. In one hour it can unload 900 tons of bauxite, manganese ore or similar material. It can handle 600 tons an hour of coal or other bulk cargo outbound. Another berth and tipple will boost its annual capacity from 3 million to 4 million tons.

The plant currently handles about 250,000 tons of bauxite annually, which comes in from Surinam on the northern coast of South America. The bauxite is conveyed to the stockpile of Aluminum Ore Co., an Alcoa subsidiary, which converts it into approximately 1500 tons of alumina daily. Last year some 100,000 tons of manganese ore was imported through the port and ferromanganese has been shipped out, headed west. Tennessee Coal, Iron & R.R. Co., is also importing Brazilian and Swedish iron ore through Mobile.

During 1947, the latest year for which figures are available, 57,585 tons of iron and steel articles and 102,652 tons of pipe and fittings were shipped out through the port of Mobile. Of these it is believed about 25 pct were actual exports, the rest were shipped west.

The job of selling new industry on a city or a locality is usually shared by half a dozen agencies. Mobile is no exception. The local chamber of commerce concentrates on the city while the state chamber does a broader job; Alabama State Docks plugs the port; Alabama Power Co. gets in its licks for most of the state with a well staffed industrial engineering department. And doing a similar job, concentrating on their own lines, are the railroads.

The Gulf, Mobile & Ohio R.R., which has its headquarters here, is typical of the more progressive southern roads. Its lines, as a result of 1947 purchases, now run from Chicago and Kansas City through St. Louis to Mobile and New Orleans, with branches to Birmingham and Montgomery, Ala. More than 65 pct of its freight cars are 8 years or less in age—a claim few carriers can make. It took delivery on some 1700 freight cars last year, has 1350 on order. It is almost 90 pct dieselized; delivery of 20 more units this year will just about complete the job.

Many plants have expanded or moved into Mobile since the war. Ideal Cement Co., bought and rebuilt a surplus sinter plant, converting it into cement plant with an annual capacity of 1,200,000 bbl. Arkell & Smiths have put up a $1 million paper bag plant.

National Gypsum, Mobile Paper, Ruberoid, International Paper, Bemis Bros. Bag, Hollingsworth & Whitney and Meyercord Lumber are among the companies that have expanded their operations here at a total cost of more than $5 million. American Cyanamid has added a $500,000 sulfuric acid department. Coastal Petroleum Co. has completely rebuilt its neighboring refinery.

Mobile is home port for Waterman Steamship Co., which operates about 50 of its own ships, and charters approximately 90 more from the government. Waterman has just finished a super modern air conditioned office building here.

Plans for new buildings and public works include a lot of apartment construction. Churches are spending over $2 million; three institutions are adding another $1.5 million in new buildings. One hotel is being renovated at a cost of $1 million. Expenditures on hospitals will run to more than $3 million; the city is putting up a $2 million jail and a new stadium will cost about $700,000. New power facilities will cost about $600,000, while the gas company is spending almost a million to increase residential service.

There are some 50 miles of highway projects afoot at a cost of $5 million; port expansion will cost at least $4 million.

MORE DOCK SPACE: *Cast iron pipe is being loaded aboard a Luckenbach freighter from one of the three parallel tracks that serve the ships at Alabama State Docks. They now have space for 22 vessels. An expansion program will permit them to berth 38 ships at one time.*

Considering Alaska As Possible Site for New Aluminum Facilities

Washington

• • • **Alaska may** take on added national and international significance if Aluminum Co. of America decides to build a plant there. Last week William E. Warne, assistant secretary of interior, said Alcoa was considering building a plant in the southeastern part of the territory.

Mr. Warne was appearing before the Senate Interior Committee, which also heard James P. Davis, director of territories, ask quick statehood for Alaska. Mr. Warne said, "I know that Alcoa has had under consideration a development in southeastern Alaska of major proportions."

When asked if Alcoa was considering the expansion because of Alaskan bauxite deposits, or because of the potentialities of cheap power in the territory, Mr. Warne said power was the sole consideration. He pointed out that a power plant would be essential to the operation.

Upon being asked about their plans an Alcoa spokesman said: "Aluminum Co. of America is actively pursuing the investigation of this project. No further comment can be made at this time."

Alcoa's investigation of Alaska as a possible future aluminum plant site has not been a secret to those in the trade. For that matter other aluminum producers have been thinking along the same lines. Other localities besides Alaska which have been mentioned during the past 6 months include South America and China.

Reason for investigation of sites outside continental U. S. is the power shortage here, one trade source said. Aluminum production requires large quantities of low-cost power. Aluminum producers have long urged, pleaded, threatened and begged for more power development. But they have categorically refused to take part in the controversy as to whether the development should be by the government or by the power companies.

More Wire Nails Shipped

Washington

• • • **Shipments of** wire nails in 1948 rose 6 pct above 1947 to reach a total of around 860,000 tons, preliminary figures compiled by the Commerce Dept. indicate.

More stable production was indicated in that the monthly totals fluctuated but little above or below the monthly averages for the year.

230 TON BABY: *One of the steel ingots in making plates for the* 2500 *ton magnet for the cyclotron now being erected at the University of Chicago is shown being removed from a heating furnace, ready for forging, at the Bethlehem plant of the Bethlehem Steel Co. It weighs* 465,000 *lb.*

Iron and Steel Heavy Scrap Drive Underway

Washington

• • • **The drive** for heavy scrap collection sponsored by the Dept. of Commerce, in cooperation with other Federal agencies and industry, is now in progress, according to Charles Sawyer, Secretary of Commerce.

Although market conditions have changed considerably since inception of the plan, Mr. Sawyer feels that it is of extreme importance to the steel industry and to our national security.

Temporarily, at least, supply is good. How long this condition will exist is problematical. Government agencies want to play it safe on a long-term basis. That's why they feel the drive is essential.

Scrap which is collected in the various industrial sites throughout the country will be processed and handled by dealers who are already in business and have the facilities and equipment for such work.

Named to AEC Committee

Washington

• • • **Ernest H. Rose,** mining and metallurgical engineer of Birmingham, has been appointed to the Atomic Energy Commission's Advisory Committee on Raw Materials, according to John K. Gustafson, manager of AEC's raw materials operations office.

Mr. Rose is presently engaged in research and development work of the Tennessee Coal, Iron & Railroad Co. directed toward the exploitation of the silicious iron ores of Alabama.

Budd Production Is High

Philadelphia

• • • **The Budd Co.** set a new production record here at its Red Lion plant in January. A total of 26 all-stainless steel railway passenger cars were delivered during that month.

Included in the shipments was the 1000th car Budd has built in the lightweight railway passenger car group. They delivered their first, The Pioneer Zephyr, to the Chicago, Burlington and Quincy R. R. in April 1934.

Randall to Head Inland Steel Sometime in April

Chicago

• • • **Clarence B. Randall,** vice-president of Inland Steel Co., Chicago, is slated to become president some time in April when Wilfred B. Sykes, now president retires. Mr. Sykes will continue to serve the company in an advisory capacity.

Clarence B. Randall

Mr. Randall started with Inland in August 1925 as assistant vice-president. He is a graduate of Harvard University and prior to joining the steel company he practiced law in Michigan. In 1930 Mr. Randall was appointed vice-president of raw materials and he has been a director of Inland since 1935. On Oct. 27 last year Mr. Randall was elevated to a full vice-presidency, from which he will move into the chief executive's office in April.

He is widely known to industry both here and abroad. He is popular with the press. News men in Chicago have always appreciated his directness and his clear-cut logic. He also has the popular reputation in industry of never beating about the bush.

Lakey Foundry Reports

Muskegon, Mich.

• • • **Net earnings** of Lakey Foundry and Machine Co., Muskegon, Mich., increased from $1,077,635 in 1947 to $1,268,073 in 1948. In the annual report to stockholders, J. O. Ostergren, president, attributes a major portion of the company's financial gains during the past year to production economies resulting from the installation of more than $1 million of new equipment since the war.

Working capital increased $515,804 during the year. Mr. Ostergren said Lakey expects to spend an additional $500,000 in 1949 for new equipment and a similar amount is being considered for 1950.

Founders Begin Monthly Statistical Service Unit

Cleveland

• • • **Gray Iron Founders'** Society is launching an industry-wide monthly statistical service and has invited the 2500 units in the industry to participate. The society has set up the machinery to obtain monthly figures on production, number of production employees, total payrolls, number of hours worked, maximum commercial demand and lost-time injuries.

E. L. Roth, president, Motor Castings Corp., West Allis, Wis., and chairman of the society's statistical committee, announced that every effort will be made to initiate the program immediately so that the statistical series will commence wih January 1949. Others on the committee are: Philip Frankel, Superior Foundry Co., Cleveland; W. F. Morton, Anstice Co., Rochester; C. R. Culling, Carondelet Foundry Co., St. Louis; W. Morley, Link-Belt Co., Philadelphia.

Cuts Areawall Prices

St. Paul, Minn.

• • • **The St. Paul** Corrugating Co. has cut the price of steel window well walls effective Jan. 15, according to company officers. Better deliveries from regular mill suppliers and economies derived from rearrangement of production facilities were cited as reasons for the reductions.

Bank President Reports Business is Leveling Off

Boston

• • • **Business in** New England has been leveling off from the postwar boom during the past year and especially during the last 2 or 3 months, according to Joseph A. Erickson, president of the Federal Reserve Bank of Boston.

"Although department stores sold about 2.5 pct more in 1948 than they sold in 1947, an analysis of store sales showed clearly that the pinch on the consumer was, if anything, becoming greater," he said.

"The shift of demand away from the higher-priced lines showed up first in jewelry and furs and was later extended to liquor and the resort hotel business. It has now been felt at the higher-priced end of most consumer goods lines and is even being felt to some extent in the automobile business," he added.

The Federal Reserve Bank president declared that consumers are definitely looking for more for their money. "They are behaving this way from choice, not from necessity. Despite substantial wage increases, consumers generally have not been able in recent months to increase voluntary savings and they are going more heavily into debt buying major items like houses, automobiles, and household appliances," he reported.

STORAGE EFFICIENCY: *Battery powered fork lift trucks are used by W. J. Bullock, Inc., to store baled scrap in the yard of their smelting and refining plant at Fairfield, Ala. This type of storage permits the plant to save yard space through vertical piling.*

New Officers Selected By Wire Rope Institute

New York

• • • **At the annual** meeting of the Wire Rope Institute recently, David Larkin was elected president of the organization for a 1-year term. He succeeds E. C. Low, of John A. Roebling's Sons Co., who became chairman of the board.

David Larkin

Mr. Larkin, executive vice-president of the Broderick & Bascom Rope Co., is a graduate of the University of Edinburgh, Scotland. He is widely known in the wire rope industry, with which he has been actively identified for 21 years. He is chairman of the advisory board, Washington University School of Engineering, St. Louis, and a fellow of the American Society of Mechanical Engineers.

In addition to Mr. Larkin and Mr. Low, other new officers of the institute are: vice-president, H. C. Parker, of Bergen Wire Rope Co.; secretary, W. A. Huber, of American Chain & Cable Co.; treasurer, D. W. Vernon, of A. Leschen & Sons Rope Co.

Monarch Reports Dividend

Sidney, Ohio

• • • **Monarch Machine** Tool Co. has declared a dividend of 50 cents per share, payable March 1, 1949, to shareholders of record at the close of business Feb. 17, 1949.

1948 Dividends Increased

Washington

• • • Last year was kind to automobile stockholders — boosting dividend payments by $100 million over 1947 to $244 million or a 40 pct gain. Mining dividends as a whole were up 25 pct, from $279 million to $353 million.

Stockholders in the steel industry received a smaller increase—a 16 pct increase which raised payments from $296 million to $345 million. Dividends for the nonferrous industries rose 8 pct to $135 million.

Reported by the Office of Business Economics, these figures represent only the publicly reported dividends which the OBE estimates cover about 60 pct of all such investment returns.

Railroad dividends were up 25 pct to $267 million while manufacturing groups as a whole climbed 15 pct, the overall average being pulled down by food, beverage and tobacco groups which remained about the same as last year.

Operates at Capacity

New York

• • • **The Foundry Div.** of R. Hoe & Co. is operating at the full limit of available raw materials, according to Joseph Auer, president of the company.

Early last year scrap and pig iron was in critical supply. At that time it was necessary for the company to make substantial purchases abroad to supplement the limited supply available on the domestic market.

Recently, however, domestic supply has improved considerably and the company is making efforts to satisfy urgent requirements.

Mr. Auer added that orders from foundry customers are a valuable stabilizing factor and that it was the company's hope that they could maintain and increase this business.

Alcoa Announces Details Of New Office Building

Pittsburgh

• • • **Construction** of the 30-story Aluminum Co. of America building in downtown Pittsburgh will begin about mid-1950. Thomas D. Jolly, Alcoa's engineering vice-president, announced recently that the building would have a facade fabricated of aluminum panels with a 4-in. backing of insulation. These will be secured to the steel frame of the building.

Aluminum will be used exclusively in store fronts, elevator cabs, trim, partitions, lighting equipment and wiring, bus bars, hardware, doors, wainscoating, flashing, coping, drainage, windows and acoustical ceilings.

Designers of the proposed structure are Harrison & Abramovitz, New York. Altenhof & Brown and Mitchell & Ritchey, Pittsburgh firms, will be associated with them. The George A. Fuller Co., New York and Chicago, has been selected as general contractor.

Installing New Equipment

Boston

• • • **Monowatt Corp.,** Newport, R. I., which recently acquired former U.S.O. Commercial Wharf property, is installing a dozen 8-ton blanking presses up to 50-ton dieing machines, multi-slide machines, plating equipment, rectifiers, automatic degreasers, tumbling machines, centrifugal dryers and electric hoists.

It plans installation of precision equipment, lathes, grinders, millers, borers, etc., and within the next 2 months 10 additional stamping presses.

AMERICAN IRON AND STEEL INSTITUTE
350 Fifth Avenue, New York 1, N. Y.

Blast Furnace Capacity and Production—Net Tons

DECEMBER - 1948
Month

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro Manganese and Spiegel		Total			
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Percent of capacity	
									Current month	Year to date
Distribution by Districts:										
Eastern	11	13,093,560	1,064,433	11,269,401	34,568	359,159	1,099,001	11,628,560	99.3	88.8
Pittsburgh-Youngstown	17	25,588,120	2,074,880	23,388,146	28,105	246,588	2,102,385	23,634,734	97.2	92.4
Cleveland-Detroit	6	6,495,000	559,246	6,076,147	-	-	559,246	6,076,147	101.8	93.6
Chicago	7	14,700,290	1,179,431	12,568,859	-	10,190	1,179,431	12,579,049	94.9	85.6
Southern	8	4,949,660	430,934	4,570,182	7,093	96,962	438,027	4,667,144	104.7	94.3
Western	3	2,612,300	216,958	2,263,206	-	-	216,958	2,263,206	98.2	86.6
Total	35	67,438,930	5,525,282	60,135,941	69,766	712,899	5,595,048	60,848,840	98.1	90.2

Republic Head Warns Disastrous Results Of Cement Decision

Cleveland

• • • **Warning of** potentially disastrous results to the nation's economy if the cement decision is carried to its logical conclusion, C. M. White, president, Republic Steel Corp., called for a halt in the march toward socialism in the nation before the 35th annual meeting of the Traffic Club of Cleveland.

Citing a statement by Lowell B. Mason, commissioner of the Federal Trade Commission, that 25 industries would be affected by the Supreme Court's decision—farm equipment, road and construction machinery and sewer pipe—Mr. White said the repercussions of the decision are so vast that it is not the problem of the steel industry, but the problem of the entire United States.

He said the contention of those who favor the abolition of the basing point method is that competition in the steel industry will be increased.

"Nothing can be more erroneous," Mr. White charged.

"As a matter of fact, the decision reduces competition and gives steel companies what virtually amounts to exclusive sales territories. It is perfectly obvious that the purchaser of steel is going to buy his product from the nearest mill. Only when he is desperately in need will he go further afield.

"That means that steel mills will have what amounts to a local monopoly on the regional business. No longer will it be either possible or probable for a steel company to reach out for distant markets."

He said freight rates can be almost as effective a barrier to the distribution of steel as are national boundaries with their customs houses.

"I am convinced that the cement case will be a hindrance to logical, healthy, industrial expansion," Mr. White stated.

"Instead of decentralizing industry, we may expect to find an even increasing centralization with its consequent economic and social problems. This in turn will have its effect upon our entire defense program, which is calling for more decentralization instead of less."

He said the entire pricing structure of the steel user will be upset, adding that the steel user, not knowing at times the source from which he will obtain tonnage, will find it difficult to quote a firm price.

Six Points on Manganese

New York

• • • Alarm over an immediate shortage of manganese ores for steelmaking purposes is unwarranted. But consideration of developing steady and reliable sources of supply and a stockpile of this strategic material is necessary. Here is the current status of the manganese ore situation.

(1) Government sources emphasize that there has been no change in the normal volume of manganese ore imports from Russia.

(2) In the event of an emergency, South Africa remains the source from which an additional supply of manganese ore could be obtained most quickly.

(3) Brazil remains the most logical source of additional manganese ore supply, but several years of development work would be necessary to substantially increase tonnages from that country.

(4) Steelmen feel that in an emergency we could operate our furnaces at current capacity by using only about 75 to 80 pct of the manganese we are now using.

(5) The American Iron and Steel Institute is currently making a study to determine to what extent it is practical to reduce manganese content in standard steel specifications as a conservation measure. When completed, the information would be held as an emergency standby measure. Hope is that it will never be necessary to adopt such specification changes.

(6) No reliable information is available as to the extent of our stockpile. Some guesses have been hazarded. These are generally placed at not more than 2 years supply and not less than 1 year.

Expect K-F, Republic To Reach Agreement Soon

New York

• • • **Reports in** the trade indicate that Republic Steel and Kaiser-Frazer may soon iron out their differences on the WAA Cleveland blast furnace. That plant is now subleased to Republic by K-F until May 1. It is natural that some agreement will soon be reached to continue the furnace under the subletting arrangement whereby Republic operates the plant.

K-F has the basic lease of the WAA equipment, but in view of the heavy requirements of ore and capital it is doubtful if K-F will insist on taking the plant over on May 1.

The main thing K-F has wanted has been steel. And it is expected that steel will be made available after all negotiations are over. Of course, any agreement will be scrutinized by Government agencies before approval.

Coming Events

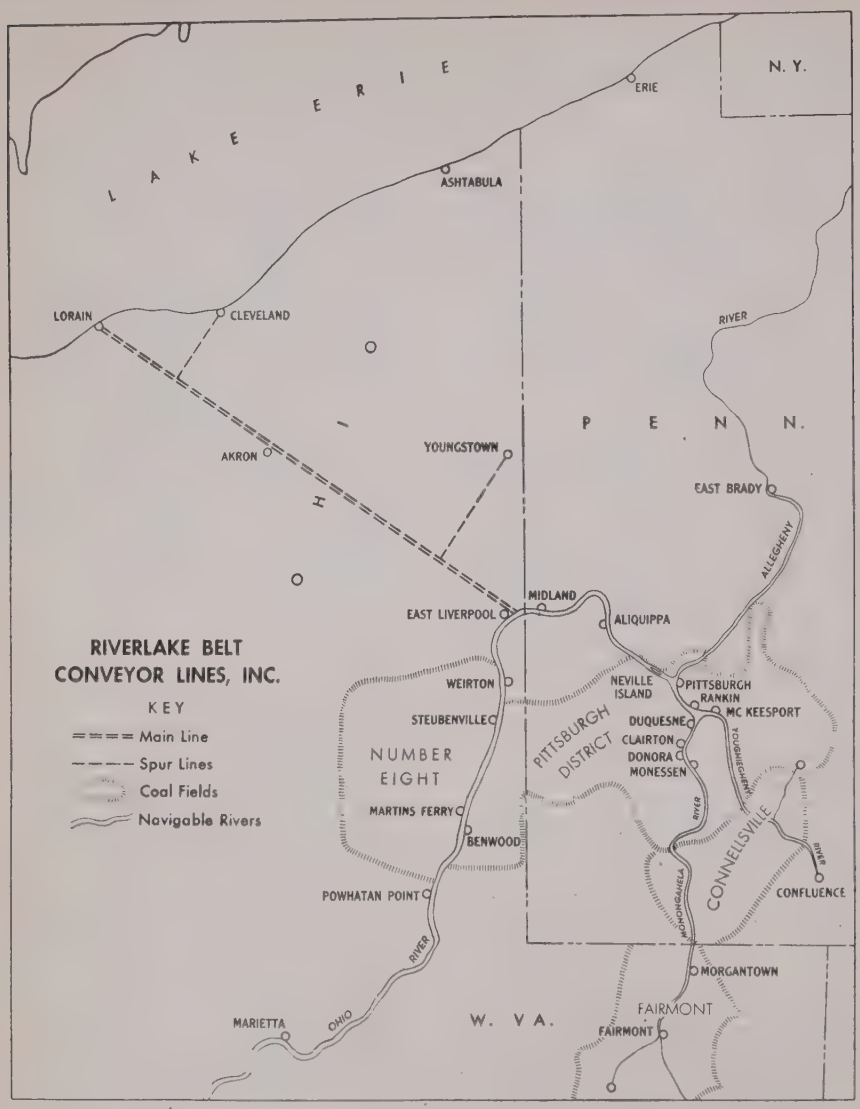
Feb. 14-17—American Institute of Mining & Metallurgical Engineers, annual meeting, San Francisco.
Feb. 23-25 American Concrete Institute, annual meeting, New York.
Feb. 28-Mar. 4 American Society for Testing Materials, spring meeting, Chicago.
Mar. 8-10 Society of Automotive Engineers, passenger car, body and production meeting, Detroit.
Apr. 4-6 American Gas Assn., distribution, motor vehicle and corrosion conference, Cincinnati.
Apr. 5-6 Metal Powder Assn., annual meeting, Chicago.
Apr. 8-9 Lead Industries Assn., annual meeting, Chicago.
Apr. 11-12 American Machine Tool Distributors' Assn., spring meeting, Savannah, Ga.
Apr. 11-14 National Assn. of Corrosion Engineers, annual conference and exhibition, Cincinnati.
Apr. 14-15 Magnesium Assn., annual meeting, Chicago.
Apr. 18-20 Midwest Power Conference, Chicago.
Apr. 18-20 American Institute of Mining & Metallurgical Engineers, annual Conference of Openhearth Steel Committee, Chicago.

Plan Continuous

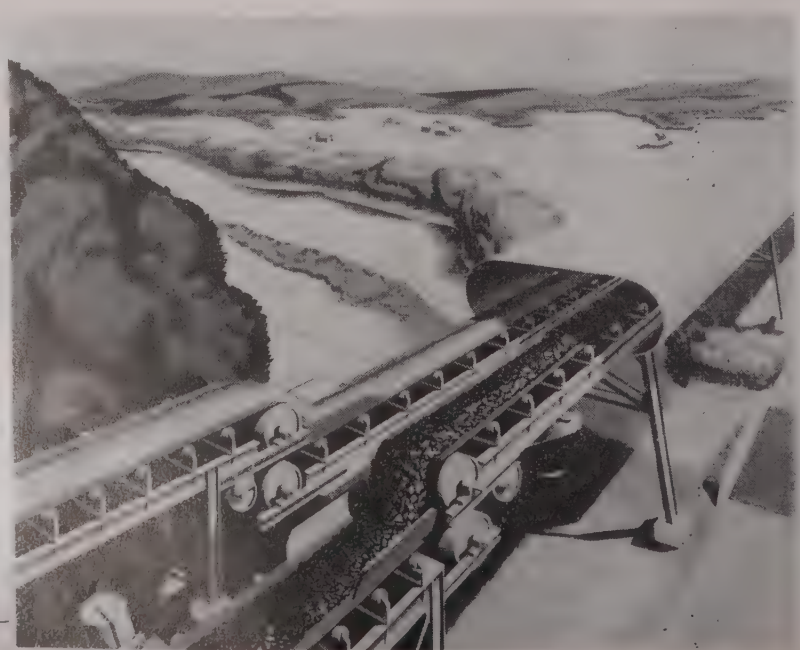
o o o

By BILL PACKARD
Asst. News, Markets Editor

o o o



ABOVE, *is a map of the projected Riverlake Belt Conveyor Line to be constructed across Eastern Ohio from Lorain on Lake Erie to an Ohio River terminal near East Liverpool, a distance of* 103 *mi. At the right is a typical transfer point on the overland belt conveyor bulk cargo line where loads of coal and iron ore will be relayed from one belt to another. On the system's main line,* 172 *separate flights of belt will link Lorain with the Southern terminal. North bound coal and south bound ore will move at the rate of* 650 *fpm. Total cost of the system is estimated at* $210 *million.*



Cleveland

• • • **Plans have** been made to build a continuous overland belt conveyor system to move ore and coal between Lake Erie and the Ohio River. The man behind the plans is H. B. Stewart, Jr., youthful president of Akron, Canton and Youngstown Railroad. Mr. Stewart revealed his plans at an informal press conference here yesterday (Feb. 9).

H. B. Stewart, Jr.

A new corporation, the Riverlake Belt Conveyor Lines, Inc., has been formed to carry out construction and operation of the project. A minimum of 3 years will be re-

Belt Conveyor Between Lake Erie and Ohio River Terminal

quired for construction, Mr. Stewart said. He emphasized that the project will be financed by private capital and that no stock issue will be offered to the public. Total cost is estimated at $210 million. Mr. Stewart asserted that the system would save from $20 million to $45 million annually in freight on iron ore, limestone and coal consumed by steel mills and other industries in eastern Ohio and the upper Ohio River valley, including Pittsburgh.

As presently planned the main line of the conveyor system, designed to handle bulk cargoes only, will be a two-way belt extending 103 miles from Lorain on Lake Erie to the Ohio River near East Liverpool. Spur lines would serve Youngstown and Cleveland, comprising a total system of 130 miles.

Mr. Stewart pointed out that iron ore moving south from the lake and coal moving north from the river are in sufficient volume to pay off the cost of construction in 20 years. At the same time rates could be low enough to save 50 cents to $1.50 a ton on coal and 47 cents to 68 cents a ton on iron ore delivered to steel mills in Youngstown and Pittsburgh, he said.

Minimum cargo volume required by the lines would be 30 million tons. This might consist of 15 million tons each of coal and iron ore. Total capacity of the belts would be 52 million tons.

Terminal facilities, to save turnaround time for lake ore vessels, and for the handling of coal and ore on the Ohio River, are also planned as separate units. Another feature would be a coal washing plant which would clean and grade untreated coal enroute. These features are expected to cost $56 million, leaving $154 million for the construction of the actual conveyor system.

Engineering phases of the project have already reached an advanced stage. Belting engineers from Goodyear Tire and Rubber Co., Akron, O. and the Link Belt Co., Chicago, and other construction, transportation and electrical experts have been working on the project for several months.

A total of 172 belts or flights, some of them more than a mile long, would be required on the 103-mile two-way main line. This would move coal north over a 72-in. belt at 600 fpm or 3400 tons per hour. The 60-in. south-bound belt would carry iron ore at the same speed. But because of the greater weight of the cargo the volume would total 5400 tons per hour. The spur belts to Youngstown and Cleveland would be 42-in. wide.

The elevated structure would have a minimum clearance of 22 ft and the metal gallery atop the steel supports would be fully enclosed. Electrically operated, the belt movements would be controlled by a push button system. An electric eye warning device would be used to locate distress points and stop the entire line immediately.

The four largest cost factors in the construction of the system are 151,000 tons of structural steel, 267 miles of rubber belting, 400,000 troughing idler units and 217 terminal power units. Man hours required to construct the line and component parts are estimated in excess of 32 million.

Mr. Stewart declined to set an exact date when construction on the system would begin. He said that was contingent upon acquiring a mandate of eminent domain from the legislature of Ohio. He reported that contracts for carrying freight were pretty well advanced. He said that the new corporation is not a subsidiary of the railroad which he heads. He declared that capital for the enterprise had all been pledged, provided that eminent domain and minimum freight contracts are achieved.

Mr. Stewart believes that traffic on the Ohio River would almost be doubled through new tonnage volume which would be added by the conveyor project. This increase in river traffic would require a considerable number of new barges and tow boats to handle the additional volume.

■

Pittsburgh

• • • **Most steel** traffic officials agree that a Great Lakes—Ohio River Valley belt conveyor has fascinating possibilities. For many steel mills in the Youngstown, Cleveland, Pittsburgh and Wheeling districts it could mean a nice saving on ore and limestone transportation costs. And for those on the Lakes coal costs could be reduced.

Project Would Be 103 Miles Long; Cost Estimated At $210 Million

° ° °

Construction of the proposed belt line could cause diversion of traffic from the Pennsylvania, Pittsburgh & Lake Erie and Baltimore and Ohio railroads. The Wheeling & Lake Erie R. R. might also be affected. The Bessemer & Lake Erie, a U. S. Steel road, would probably be unaffected.

If the line is built the roads would probably cut rates, making special trainload rates on coal, iron ore and limestone. They would have as a precedence the blackstrap molasses rate from New Orleans to the St. Louis areas, the bauxite rate from Mobile into the state of Washington.

Steel company purchasing and traffic men maintain that rates on ore have been too high anyway. But certainly if the carriers were forced to cut rates to retain this attractive business they would make less money and if they cut rates to forestall the conveyor project they might have trouble boosting them again once the threat was over.

Traffic men need time to study all the angles before they can tell what mills the conveyor would benefit. East Liverpool is about midway on the Ohio River between Pittsburgh and Wheeling district plants. If barge transportation is to be used from there to the mills some barges will have to be built. Barge unloading facilities will also have to be installed at most mills, which now unload from railroad cars.

Cost of these facilities will have to be weighed against the conveyor rate plus the barge rate. Mills will then have to consider the likelihood of a rail rate cut designed either to forestall the conveyor project or to lure business from it.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

800 Tons, Philadelphia, Delaware River Bridge, through Kauffman Construction Co., to Harris Structural Steel Co., New York.

300 Tons, New York, N. Y., 2-story garage, 11 Ave. & 49 St., New York, to Grand Iron Works, Inc., New York.

210 Tons, Lancaster Co., Pa., Pennsylvania Turnpike, Section 24-C, bridge, through John H. Swanger, Lancaster, Pa., to Bethlehem Steel Co., Inc., Bethlehem.

190 Tons, Thornton, Calif., swing bridge across Mokelumne River, through Lord & Bishop, to Moore Dry Dock Co., Oakland.

170 Tons, Norristown, Pa., Bell Telephone building, to Bethlehem Steel Co., Inc., Bethlehem.

• • • **Fabricated steel inquiries** this week included the following:

1000 Tons, Boston, housing project, Franklin Ave., Dorchester, Abraham Polin, contractor.

1000 Tons, Boston, Mystic Pier, Charlestown. Thomas Worcester, Boston, engineer.

835 Tons, Santa Barbara, Calif., tunnel supports and lining, Tecolote Tunnel, Bureau of Reclamation, Goleta, Calif., Spec. 2556. Bids to March 10.

160 Tons, Trenton, N. J., bridge, New Jersey Dept. of Highways, due Feb. 10.

• • • **Reinforcing bar awards** this week included the following:

1000 Tons, Cambridge, Mass., Eastgate Apartments, Memorial Drive, through Thomas Worcester, Boston, to Bethlehem Steel Co., Inc., Bethlehem.

400 Tons, Lancaster, Pa., Pennsylvania Turnpike Section 24-C, bridge, to John H. Swanger, Lancaster, Pa.

300 Tons, Dauphin and Lebanon Counties, Pa., Pennsylvania Turnpike, bridge, Section 23-B, to J. H. Williams Co., York, Pa., sublet to H. T. Osborn Co., Franklin, Pa.

• • • **Reinforcing bar inquiries** this week included the following:

1355 Tons, Los Angeles, Los Angeles River improvements, Los Angeles District, Corps of Engineers, Ser. No. Eng-04-353-49-47. Bids to March 3.

435 Tons, Beloit, Wis., High School Building previously reported Sherry Richards Co., Chicago, low bidder.

325 Tons, Elmhurst, Ill., Junior High School Building reported last week, Pat Warren Construction Co., Chicago, low bidder.

120 Tons, West Springfield, Mass., construction of dike and pumping stations. Bids due March 3. U. S. Corps of Engineers, South Boston, Mass.

115 Tons, Cambridge, Mass., Botanic Garden apartments. Aberthaw Co., contractors.

50 YEARS AGO

THE IRON AGE, *February 9, 1899*

• As soon as the weather permits, "Lukens Iron & Steel Co. of Coatesville, Pa., expects to begin work on a new plant of 10 openhearth steel furnaces of 50 tons capacity each."

• **"The Bethlehem Iron Co. has just finished the largest steel shaft ever made in the world. It is for the Boston Elevated Rwy. and weighs 170,000 lb. It is 28 ft long and 3 ft in diam."**

• Seems that there was some controversy over armor plate patent rights. THE IRON AGE reports, "The President has decided that the Secretary of the Treasury can not pay to the firm of Schneider & Co. of Cruesot, France, the sum of $50,000 in settlement of the claim of the company for alleged infringement of their patents for producing nickel steel armor unless the companies who made the armor for the Government agree to the compromise."

• **Iron and Steel News: San Francisco—"We have now had about a week of the finest weather that we have ever had in this State; in fact, never since the white men have entered the country has the weather been so warm in January."**

• How true! "After due allowance has been made for the claims of enthusiasts in regard to the coming automobile and the promises of inventors and promoters, it still seems safe to assume that the practical introduction of the horseless carriage has been accomplished."

• **The puddlers didn't make out so good on this one. At a conference with James H. Nutt of the Iron Manufacturers Assn., in Youngstown, "It was shown that the average prices of bar iron for December and January did not warrant any advance in wages."**

• "Preparations are being made for the keel of the new battleship **Maine** to be laid at Cramp's shipyard in Philadelphia, on Feb. 15, the first anniversary of the destruction of the former warship of that name in Havana Harbor."

Delivers First of 20 Pan-American Planes

Portland, Ore.

• • • **Boeing Airplane Co.** last week delivered the first of 20 stratocruisers ordered by the Pan-American-World Airways at a cost of approximately $1½ million each.

This double-deck plane is fitted to accommodate 75 passengers, cruises at 340 per hr and is expected to be put into service between San Francisco and Hawaii.

Sixty-two persons were aboard the ship on the flight from Seattle to this city which took 48 min. After Pan-Am paid Boeing officials $1 million on the $30 million contract, the stratocruiser continued to San Francisco where it arrived 1 hr 54 min after takeoff.

Boeing now has a total of 55 Stratocruisers on order for several airlines and reports approximately 800 hr of test flights and a total of five ships now in the air.

Takes Over New Firm

Philadelphia

• • • **The East Penn** Foundry Co., Macungie, Pa., soil pipe producer, has bought out the Williamstown Foundry Corp., Williamstown, N. J., also a producer of soil pipe. The president of East Penn Foundry Co. is H. M. Singmaster.

Willys-Overland Profit

Toledo, Ohio

• • • **Willys - Overland Motors** showed a net profit of $1,847,800.74 for the first quarter of its current fiscal year, ended December 31, 1948, according to James D. Mooney, president and board chairman.

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MOTCH & MERRYWEATHER CIRCULAR SAWING MACHINES

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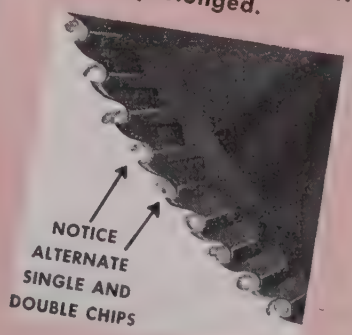

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An almost endless range of difficult requirements can be met by M & M circular cut-off machines. Special models are being built to handle practically any material, ferrous or non-ferrous; round, square or structural . . . always with Triple-Chip advantages: faster feeds and record-breaking speeds; clean, square, accurate lengths without burr; longer blade and tool life. Also, Motch & Merryweather is building special "many-in-one" models which combine cutting off with threading, center drilling, reaming, facing, chamfering and turning. Our technical staff will be glad to design a combination machine for you which will pay for itself and go on to show a handsome profit in 1949.

Only M & M builds ALL 3: CIRCULAR SAW SAW BLADE BLADE GRINDER

What, sir, are your requirements?
We will give them prompt attention.

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING • CLEVELAND 13, OHIO

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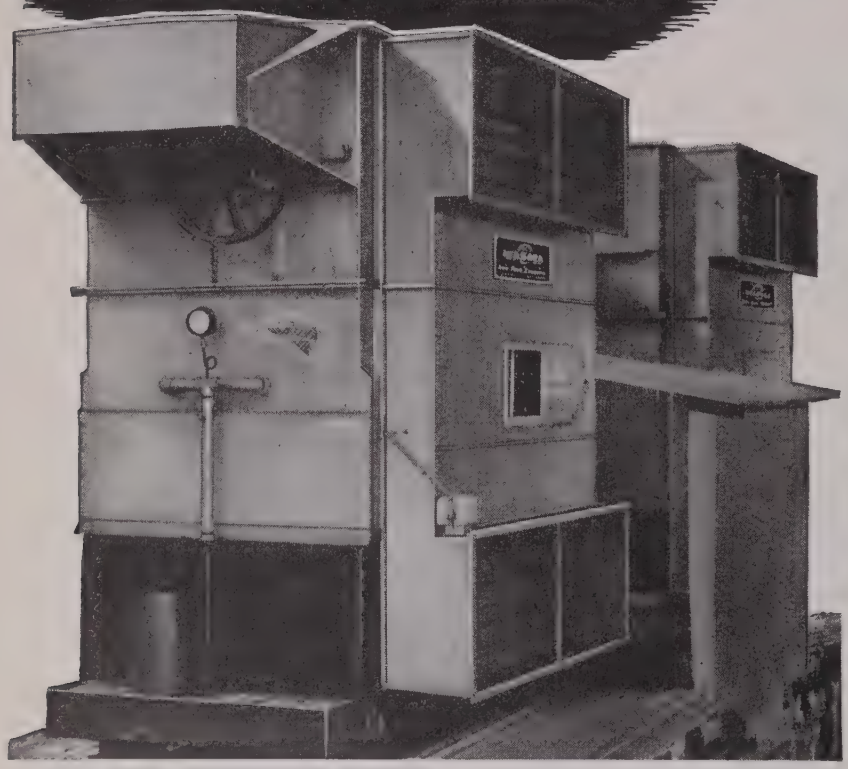
Improve Physical Properties with NIAGARA "Aero" Cooling



● Better control of quenching temperatures improves the heat-treating process, gives better physical properties to steel, increases production with fewer rejections.

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NIAGARA AERO HEAT EXCHANGERS are built in a range of sizes to fit any installation. Saving of cooling water quickly pays for the equipment.

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Write for Bulletin No. 96-

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Business Men Want To Know What Pricing Practices Are Legal

New York

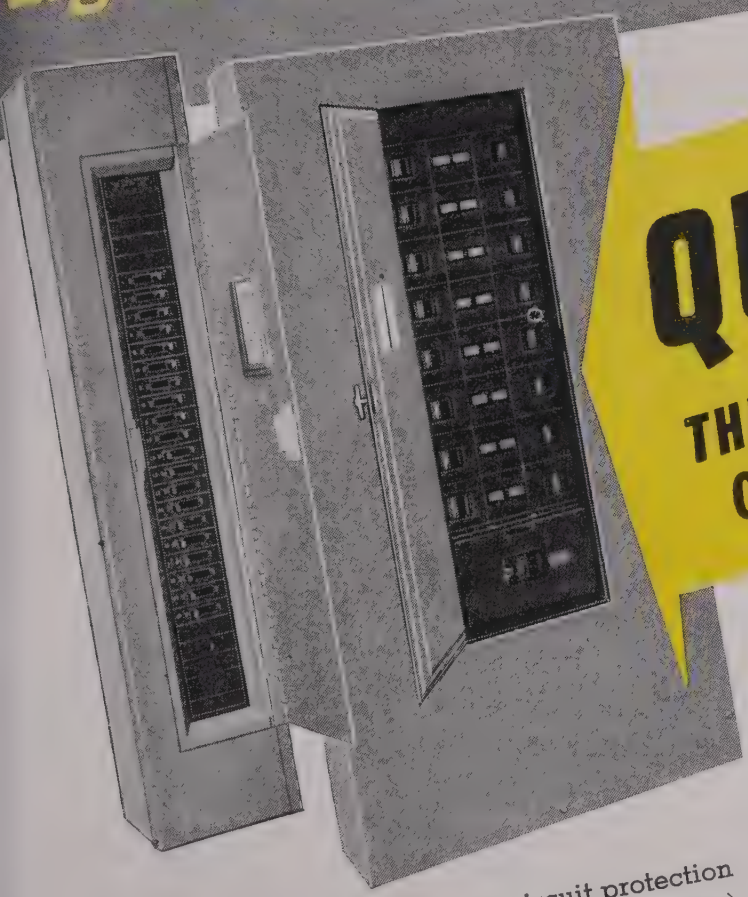
• • • **With the** legality of virtually all pricing policies except f.o.b. mill used in this country in question as the result of Supreme Court decisions in cases brought before that body under Federal Trade Commission rulings, business men are entitled to know what they must do to be certain they are obeying the law, according to a study of basing point in pricing in the Winter issue of *The Index,* published by the New York Trust Co.

"The existing confusion," *The Index* observes, "as to what pricing practices are legal and what are illegal is a serious handicap to the current operations of large segments of industry in the United States as the representatives of the railroads, the construction industry and many other important groups, industries and businesses have testified before the Senate subcommittee investigating the whole matter of pricing.

"Many of the business men appearing before the committee apparently are not reassured by interpretations of the Federal Trade Commission ruling, which do not clearly define the legality of any pricing system except f.o.b. mill. These business men maintain that system of free competition and nationwide distribution existing in the United States depends upon the freedom of the manufacturer to absorb freight charges to the extent necessary to meet competition, and point out that this system has enabled the development of mass production technique in this country whereby manufacture of numerous articles is concentrated in a few areas widely separated from many of their markets.

"There is urgent need for clarification of the legality of pricing practices so that business men may know what they must do to be certain they are obeying the law. Such clarification would be a promise not only that this will remain a government of laws, but of laws that men can understand."

SQUARE D
Lighting and Power Panelboards
FEATURE



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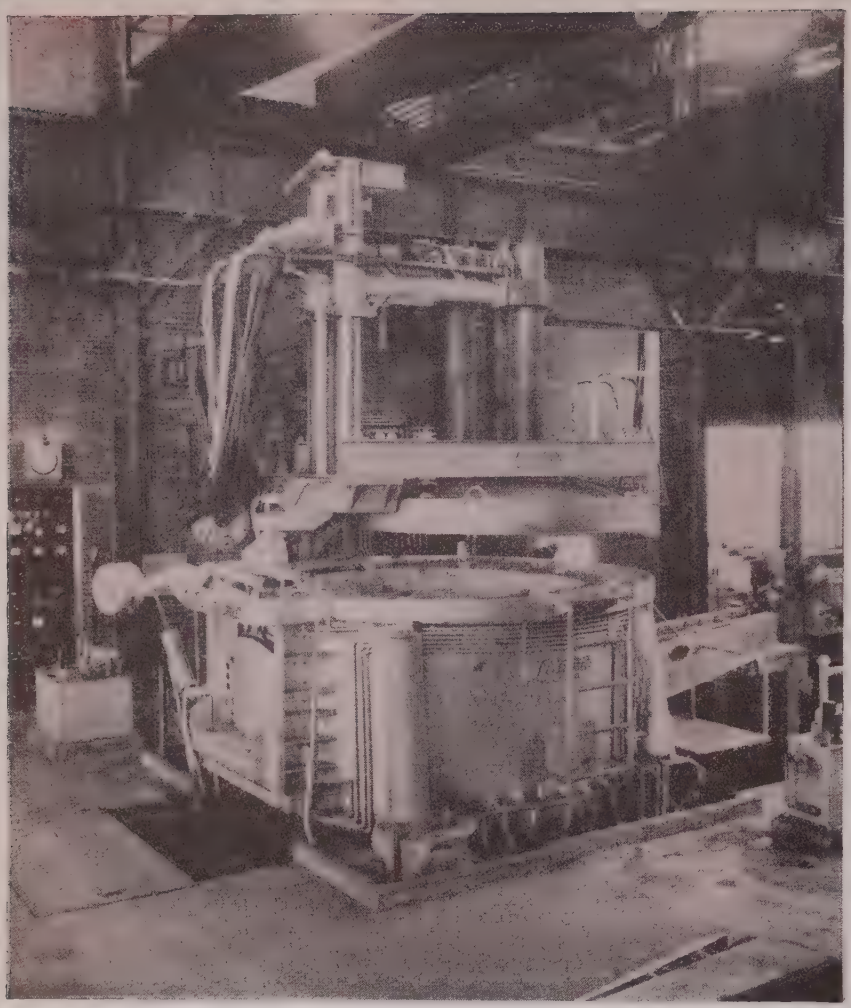

A size OT Pittsburgh Lectromelt Furnace shown with the roof in raised position and swung aside for charging. This size Lectromelt has an hourly rating of six tons and normally pours 12 to 15 tons per heat. The Lectromelt OT is particularly popular for use in making billet size ingots and its output capacity is approximately that of a 100 ton open hearth furnace operated continuously on batch cold melt pig and scrap basic or acid working. Note particularly the four point roof suspension, large diameter roof ring, hydraulic tilting mechanism and power-operated electrode clamps—all features which provide efficiency and durability in operation.

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Central Iron & Steel Spends $2 Million On Improving Facilities

New York

• • • **The Central** Iron & Steel Co. of Harrisburg, Pa., subsidiary of the Barium Steel Corp., has spent approximately $2 million during the past year in enlargements and improvements to its steelmaking and plate rolling facilities, according to the Barium Steel management. As a result of these improvements Central Iron & Steel has substantially increased its ingot capacity and doubled its plate finishing capacity, the company reported.

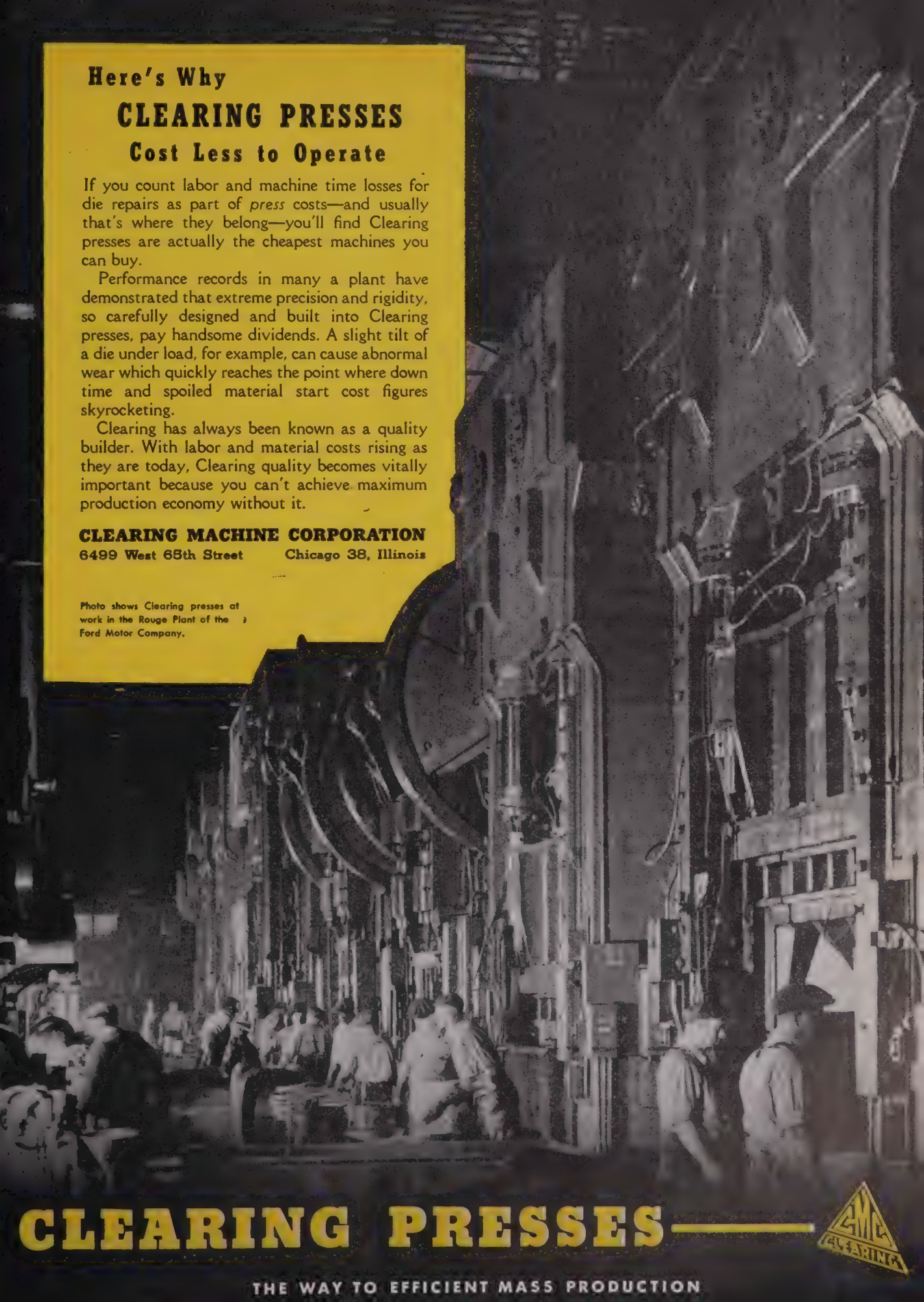
The most noteworthy advance has been the installation of three 96 in. shell cupolas producing hot metal for its refining furnaces, the company declares, adding: "This development was made necessary to replace the dwindling supply of pig iron and has resulted in the speeding up of its heats and has substantially increased Central's ingot capacity."

Gas producers, which formerly were used in connection with the openhearth furnaces, have been eliminated and a change made to oil. Waste heat boilers were also added to increase steam supply. A 30 ton electric furnace, together with the necessary electrical installations, was installed.

A blooming and slabbing mill complete with auxiliary equipment is now being installed. The capacity of this mill is rated at 90 tons per hour from ingot to slabs necessary for its finishing mills. This mill should double Central's plate finishing capacity, the company said. Ingots will be heated in a modern six hole soaking pit serviced by two 15 ton soaking pit cranes. New housings, edger, shear, manipulator and tables, have been purchased and are now nearing completion.

The potential capacity of the universal mill has been increased principally by the installation of a continuous furnace, slab table and shears. This mill has been supplying skelp for the pipe manufacturers and also a slabbing mill for steel plate. When the new blooming and slabbing mill is completed, the universal mill will be used solely for finishing.

The rolling capacity of Central's 89 in. finishing mill has been in-



Here's Why

CLEARING PRESSES

Cost Less to Operate

If you count labor and machine time losses for die repairs as part of *press* costs—and usually that's where they belong—you'll find Clearing presses are actually the cheapest machines you can buy.

Performance records in many a plant have demonstrated that extreme precision and rigidity, so carefully designed and built into Clearing presses, pay handsome dividends. A slight tilt of a die under load, for example, can cause abnormal wear which quickly reaches the point where down time and spoiled material start cost figures skyrocketing.

Clearing has always been known as a quality builder. With labor and material costs rising as they are today, Clearing quality becomes vitally important because you can't achieve maximum production economy without it.

CLEARING MACHINE CORPORATION
6499 West 65th Street Chicago 38, Illinois

Photo shows Clearing presses at work in the Rouge Plant of the Ford Motor Company.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

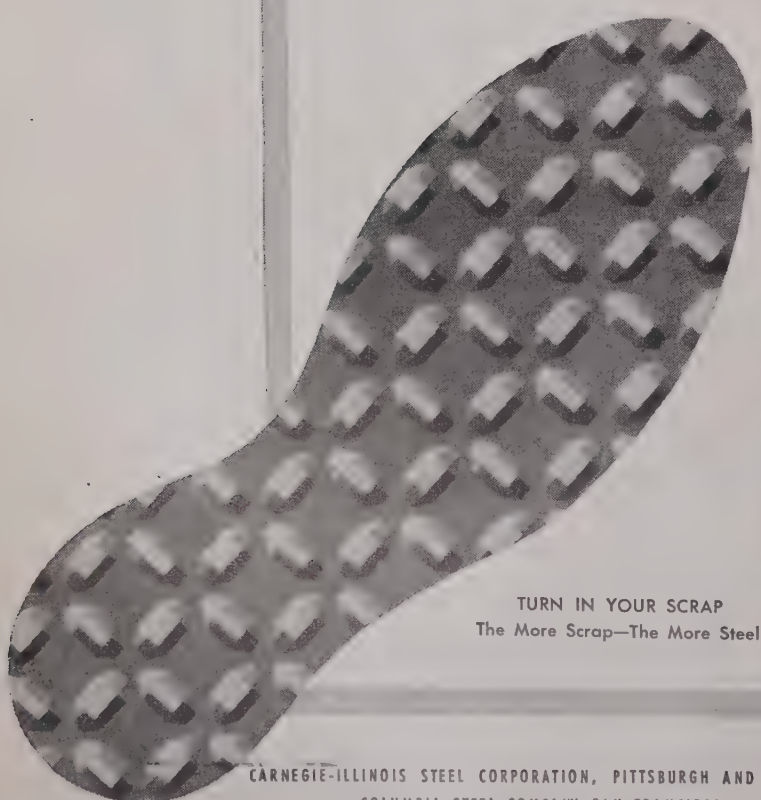
A turtle on his back is helpless

. . . and so are your plant workers when they lose their footing on smooth, slippery floors.

Unsafe footing can be costly—in injuries, in lost man-hours, and in decreased operating efficiency. Install U·S·S Multigrip Floor Plate wherever sure footing is essential. Whether it is wet or dry, Multigrip offers skid resistance and traction in all directions.

It's economical, too. Installations are permanent, reducing plant maintenance costs. It's easily cleaned . . . there are no pockets in which grease, dirt and water can accumulate. And the evenly spaced, flat-topped risers are comfortable underfoot, tend to lessen fatigue.

Get further information about Multigrip from your nearest steel warehouse or write to us direct.



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The More Scrap—The More Steel.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK
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USS
MULTIGRIP FLOOR PLATE
UNITED STATES STEEL

creased to over 500 tons per day from its former 200 ton a day rating. A charging machine, additional shears, leveling equipment, run-out and transfer tables, continuous furnace, together with an additional mill building and enlarged shipping facilities, have been installed to effect this increase.

At the 126 in. mill, new tilting tables have been added which have served to increase the efficiency of this mill. An additional shear, capable of shearing up to 2¼ in. plate, has been purchased and is being installed.

The management estimates that Central's present plate rolling capacity will be doubled upon completion of the blooming and slabbing mill and the improvements and additions currently being made to Central's other mills.

The company has changed over its steam plant from hand fired coal boilers to oil. Waste heat boilers have been installed wherever practical. Three electric hydraulic pumps have replaced the old steam hydraulic pumps which has substantially increased the available steam supply.

An additional 42 in. universal mill has been purchased for future installation. Two 4500 hp steam engines and necessary boilers have been purchased which will be adapted to power this mill.

The fabricating plant has been modernized by the addition of new equipment such as a 17 ft welding machine, 16 ft bending roll, press brakes, additional cranes and handling equipment.

The company said it also has plans to provide increased ingot capacity at its Harrisburg plant.

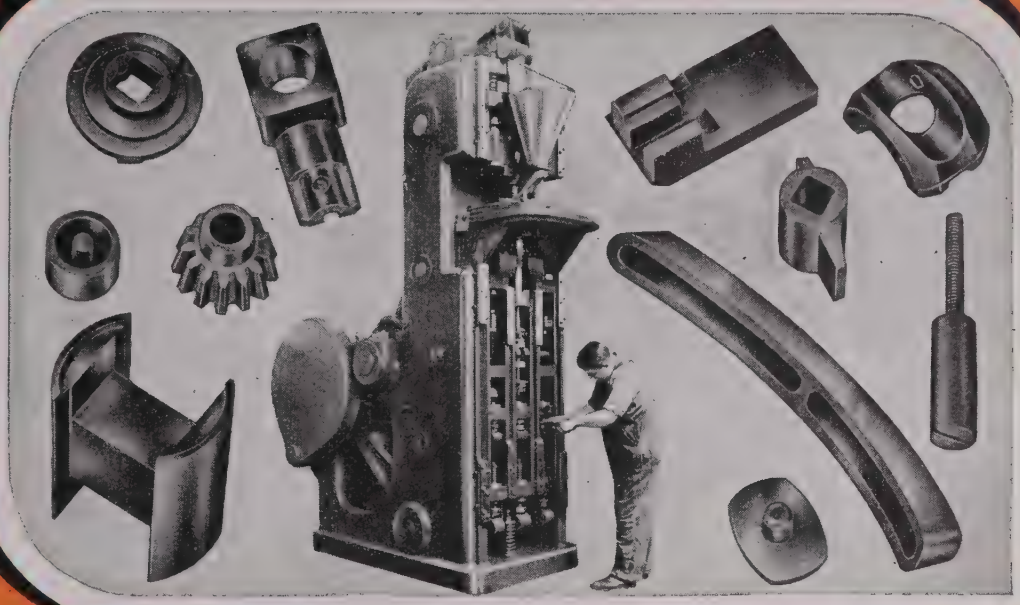
Largest Boston Girder

Boston

• • • **The largest** girder ever to be carted through Boston streets —56 tons of steel—arrived in Boston Jan. 24 for the new Jordan Marsh department store building being erected at downtown Summer and Chauncey streets. The builder girder, 70 ft long and 11 ft high was fabricated at the plant of the Lehigh Construction Co., Pottstown, Pa., and it took 4 days to get here. Just in case the huge girder got lost, stamped on the side of it were the words "return to Pottstown, Pa."

ASK STOKES

Design for Powdallurgy* production to cut Manufacturing costs



POWDURGY* should be considered when you need volume production of many small metal parts. Reduced labor and machining costs often save as much as 50%. Frequently the product is improved.

Stokes Advisory Service is confidential, resourceful . . . offers you the experience of 20 years in Powdurgy as a science. Stokes works with your design engineers on punches and dies, on the adaptation of equipment to insure production of only what is practical, economical, profitable.

Choice of equipment, if Powdurgy is the proved answer to your problem, is made from the *complete* Stokes line of Powder Metal presses. There is no compromise between what you need and what Stokes offers, for Stokes makes every type of Powdurgy equipment.

For detailed information on your Powdurgy problems and possibilities write F. J. Stokes Machine Company, 5904 Tabor Road, Philadelphia 20, Penna.

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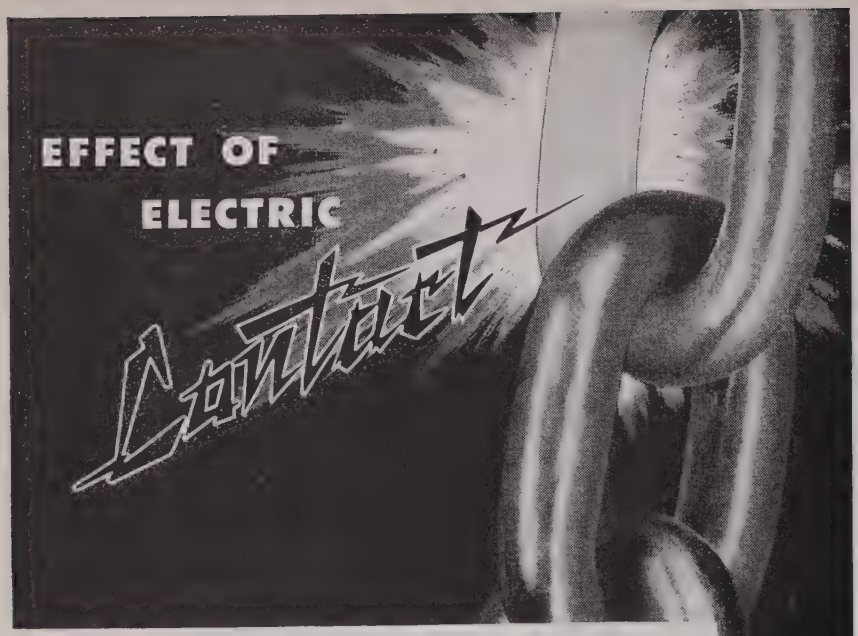
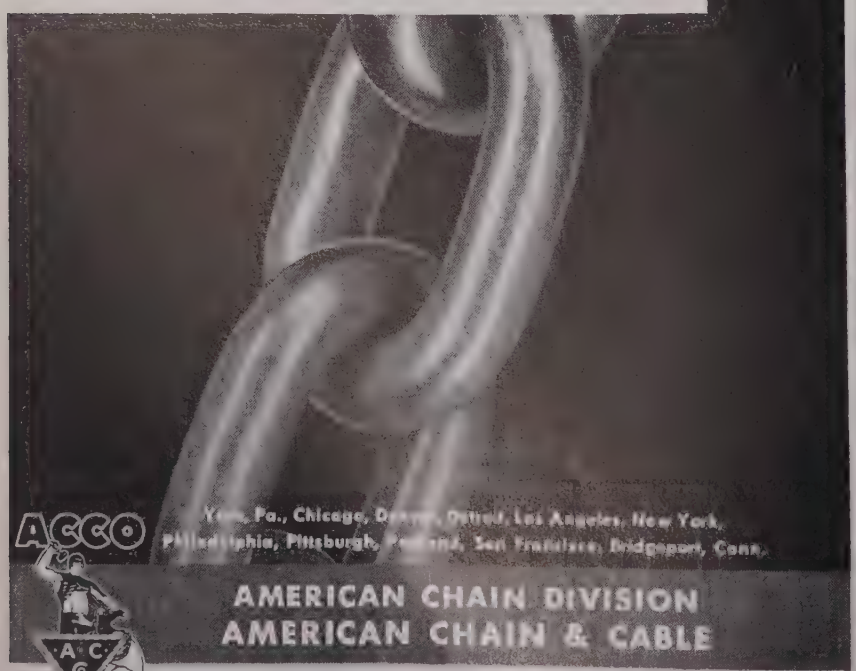
Stokes makes Plastic Molding Presses, Industrial Tablet Machines, Pharmaceutical equipment, Vacuum Pumps and Gages, High Vacuum equipment, Water Stills, Vacuum Metal-Coating equipment, Special Machinery.

STOKES KNOWS HOW



POWERFUL STEEL FINGERS form wire into links. Then *contact* with electric power makes a strong, permanent weld—and the link is joined into another good AMERICAN CHAIN. • Most types of chain are made on automatic or semi-automatic machines. But the high quality of AMERICAN CHAIN is maintained by systematic inspections and tests made by men of long experience. Even though machines have taken the place of muscles, chain-making is still a highly specialized craft. And AMERICAN chainmakers are proud of their craftsmanship.

BUY AMERICAN
—the COMPLETE Chain Line



ACCO

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AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

Predict Biggest Year Of Military Buying In Postwar Stockpiling

Washington

• • • **The national** military establishment will buy more industrial goods this year for its stockpiles of critical materials than at any time since the peak of war production.

The Munitions Board, in announcing its accelerated stockpiling program last week, revealed that it already had spent nearly $1.5 billion for vitally-needed defense materials. And the Board will soon ask Congress for $40 million in cash and another $270 million in contract authority—all to be spent during the current fiscal year.

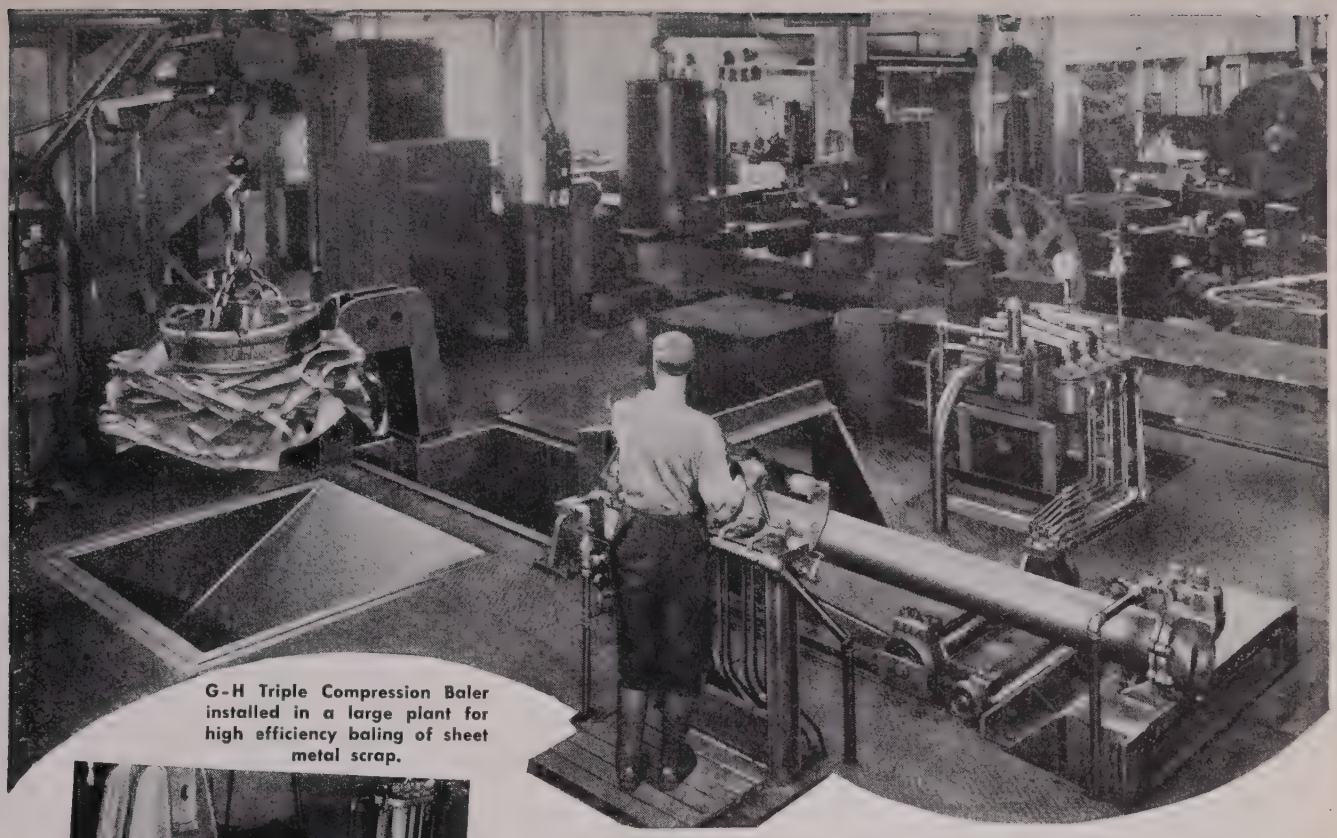
President Truman has asked Congress to appropriate $525 million for fiscal 1950. Appropriations committees of the Senate and House are now considering this request.

The stockpiling goal—as set by the Munitions Board—is about $3.7 billion worth of war-needed materials by 1951, according to Donald F. Carpenter, chairman of the Board.

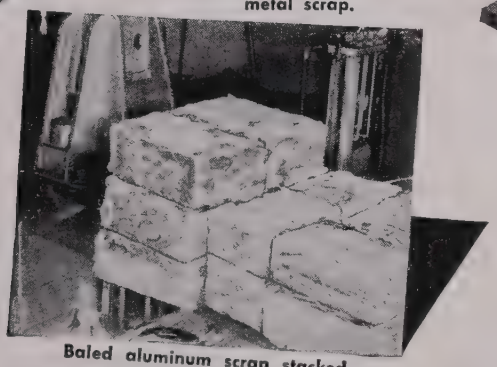
The speed-up in the buying program represents an abrupt departure in the procurement policies exercised by the Munitions Board since the end of the war. The Board's policy previously had been to buy little or none of the industrial materials in short supply. Under the new policy, the Board is negotiating for purchases without primary regard for the supply-and-demand situation.

Carpenter disclosed last week that nearly half of the 1834 purchases made since the stockpiling program started in July, 1946, were made in the second half of 1948. Prior to July, 1948, the average purchase price paid by the Munitions Board was $378,000, but during the last half of 1948 the average price was $465,000.

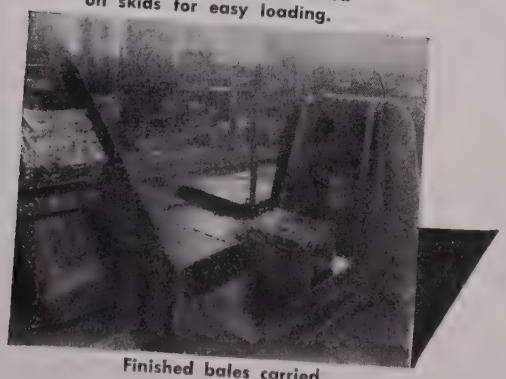
The principal factor responsible for the accelerated program is the Board's decision to disregard the relationship between military stockpile purchases and the needs of the civilian economy, Carpenter said. "In the earlier phases of stockpiling, the policy followed was that purchases were to be made only where they would not



G-H Triple Compression Baler installed in a large plant for high efficiency baling of sheet metal scrap.



Baled aluminum scrap stacked on skids for easy loading.



Finished bales carried to cars by conveyor.

Baled Sheet Metal Scrap is Vital to Production . . .

A steady, adequate flow of properly prepared scrap metal, both ferrous and non-ferrous, to the mills, smelters and foundries is highly essential to meet the increasing demand for new metal and castings. Today it is indispensable in maintaining high-level industrial production.

A most desirable type of "scrap" is *sheet metal scrap* in the form of dense, compact bales . . . correctly sized and classified. It can be used immediately, without extra handling or preparation, to charge furnaces or cupolas. That's why it always commands premium prices.

If your daily accumulation of sheet metal stampings or clippings amounts to 5 tons or more, you will find it profitable to bale it the G-H way. Furthermore, you will be contributing to your own continuous supply of new metal!

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. . . builds Hydraulic Scrap Metal Balers in a complete range of sizes and capacities from ¼ ton to 20 tons per hour and more.

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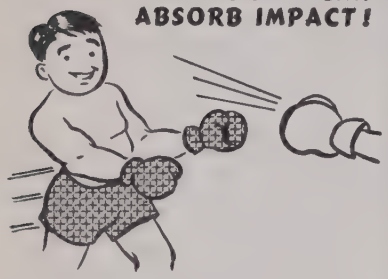
A5247-1P

SURE, WE'VE MET... I'M CRIMPY THE BUFFALO WIRE CLOTH MAN

I don't mean to brag, but
WHEN I'M SQUARE MESH STAINLESS STEEL . . . *you can't top me for sizing, separating, bolting and filtering jobs . . . especially in such industries as abrasive, sand, refractory, minerals, salt, chemical, flour, food, textile, paint and pharmaceutical.*

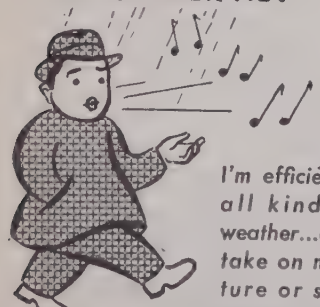
I'M TOUGH – CAN ABSORB IMPACT!



It's hard to wear me out . . . and then I "wear clean". In fact, I last 4 times longer than many other fabrics. Break? I doubt if you can do it. After all, I've twice the tensile strength of ordinary steel.

100 PROOF...THAT'S ME!

I'm rustproof, tarnish proof, corrosion resistant, wear resistant, non-contaminating, non-discoloring. Need any more proof? Even high temperatures don't weaken me.

MOISTURE OR HUMIDITY DON'T BOTHER ME!

I'm efficient in all kinds of weather...don't take on moisture or swell like non-metallic cloths. That's why I'm used so much for bolting.

I'M FAST AS LIGHTNING!

With my smooth, polished surface, things whiz through me . . . very important in the smaller meshes, you know, to avoid blinding.

Buffalo SQUARE MESH STAINLESS STEEL WIRE CLOTH is available in bolting and market grades, as well as special types for Salt Filter Slurry Screens and Backing Wire. It is furnished in rolls, cut pieces, reel covers or panels bound with webbing.

HELPFUL LITERATURE FREE ON REQUEST
Bulletin 590 Bolting Cloth
Bulletin 596 Market Grade
Bulletin 802 Salt Filter Slurry Screens and Backing Wire

Buffalo WIRE WORKS CO., INC.
Manufacturer of All Kinds of Wire Cloth Since 1869

456 TERRACE **BUFFALO 2, N. Y.**

conflict with civilian demands," the Board said in announcing its new policy. "Under the new policy, this limitation is no longer effective."

While in some cases it may be necessary to cut into supplies needed to fill civilian demands, this will mean only the deferment of a few requirements now so that the country will not be dangerously short of critical materials later, should there be a national emergency, Carpenter said.

But the stockpile will be for essential civilian needs as well as for military requirements, he stated.

Carpenter listed two other factors responsible for the speed-up in purchases: (1) Procurement methods are now "smoothed out," so that the rate of purchase is almost wholly governed by the availability of money and materials, (2) the cooperation now given by industry—particularly copper, lead, and zinc producers—has had a beneficial effect on the program.

The Economic Cooperation, the Bureau of Federal Supply, and the Munitions Board, meanwhile, have been exploring the possibilities of obtaining materials from ECA countries. Carpenter points out that ECA already has delivered or contracted for about $25 million worth of materials, including rubber, industrial diamonds, and sisal. Negotiations for other products are under way.

Materials Seen Easier

Hamilton

• • • **National Steel** Car Corp., Ltd., is maintaining operations at capacity, although it has had to face many problems in obtaining raw materials, according to R. S. Hart, president. The plant is working on an order for 1500 box cars for the Canadian Pacific Railway Co., which is expected to be completed by the middle of March, at which time the company will start on an order for 1000 automobile cars for the Canadian National Railways.

Mr. Hart further stated that the outlook for materials seems to be improving and should be sufficient to maintain production without shutting down. Principal materials in short supply are steel and lumber.

Pig Iron Output For Month of December '48 Sets All-Time Record

New York

• • • **Pig iron** production in December was higher than in any previous month in war or peace, at 5,525,000 net tons, according to the American Iron & Steel Institute. The total for 1948 at 60,136,000 tons is a peacetime record, 1,629,000 tons larger than in 1947, but short of the 1944 wartime record by more than 1 million tons because of the setbacks during the April and July coal strikes of 1948.

Including ferromanganese and spiegeleisen, December output was 5,595,000 tons, making the total for the year 60,848,840 tons. Blast furnace operations in December were at 98.1 pct of capacity and at 90.2 pct for the year. Foregoing figures on pig iron output include silvery iron.

Production of alloy steel ingots and steel for castings made a peacetime annual record in 1948 at 8,472,781 net tons, compared with 7,428,231 tons in 1947. Open-hearth output accounted for 6,401,000 tons of this total while electric furnace alloy output was nearly 2,072,000 tons.

Total electric furnace output attained a record, exceeding war years, at nearly 4,979,000 tons, owing to large production of carbon steel in this type of furnace. This figure exceeded that of 1947 by 1,191,000 tons.

Total ingot and steel for casting production in 1948 was revised to 88,533,729 net tons, compared with 84,894,071 tons in 1947.

Group Elects Officer

Detroit

• • • **Stewart Kerr,** a Detroit attorney, has been appointed executive secretary of the National Assn. of Engineering Companies, according to Walter W. Schmitt, president of the organization.

One of the major functions of the National Assn. of Engineering Companies in 1949 will be that of improving the ethical conduct of engineering enterprises. The entire program of the group, now in the process of reorganization, has not been announced.

BECAUSE THEY ARE QUIET and fume-free, battery industrial trucks can be used in virtually any part of the plant. They can even be provided with spark-enclosed construction if fire and explosion hazards exist.

They use low-cost electric power and use it with peak efficiency . . . starting instantly, consuming no power during stops. Their electric motors have few wearing parts; are easy to maintain; rarely need repairs. Thus they have inherent economy and dependability.

They are doubly dependable and economical when powered by EDISON Nickel-Iron-Alkaline Storage Batteries. These are the longest-lived and most durable of all batteries, with steel cell construction, electrolyte which is a preservative of steel, and a foolproof principle of operation.

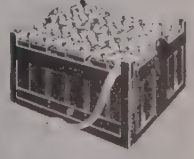
If you do not already use EDISON, get a current price quotation —you will probably find initial cost *much lower* than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION

of Thomas A. Edison, Incorporated, West Orange, N. J.

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Increase Tool and Die Life

with PANGBORN HYDRO-FINISH

What is Pangborn Hydro-Finish? It's the new, versatile impact blasting process that uses a fine mesh abrasive suspended in water, yet holds tolerances of the work to .0001 inches.

What Hydro-Finish can do for you Pangborn Hydro-Finish can help you three ways, by improving surface finishes, by removing oxide scale, by lengthening tool and die life through proper maintenance. Here's how . . .

In the Production Line . . . It eliminates many tedious finishing operations. It reduces cost and time involved in buffing. It improves fatigue life of the metal parts it finishes. It cuts many varied manufacturing costs.

In the Tool Room . . . New Hydro-Finish simplifies the manufacture and maintenance of tools, dies and molds. It reduces usual costly handwork and produces a surface virtually free from directional grinding lines.

Write today for details about the new Pangborn Hydro-Finish Cabinet. PANGBORN CORPORATION, 1201 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn For All Latest Developments In Blast Cleaning And Dust Control Equipment

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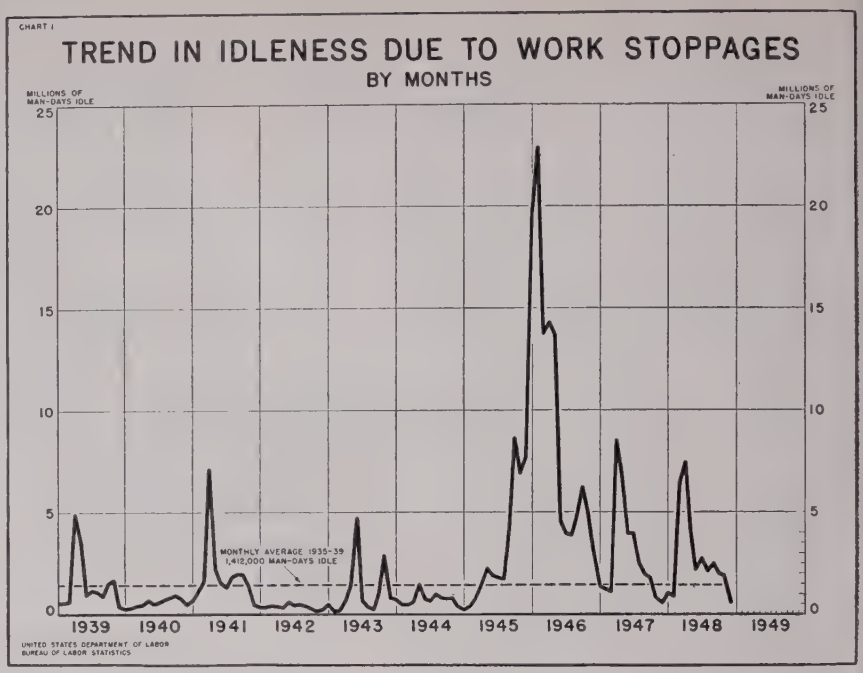
BLAST CLEANS CHEAPER
with the right equipment for every job



BLS Study Reveals Strikes Fell Back To Normal in 1948

Washington

• • • **About** 3300 work stoppages due to labor-management disputes occurred during 1948, according to preliminary figures of the Bureau of Labor Statistics.

Despite 20 large strikes—including the bituminous shutdown, the short Chrysler walkout, and the packing-house strike—slightly less than 2 million workers went on strike last year. The figure was 2.2 million in 1947 and 4.4 million in 1946, last year of the Wagner Act.

Without taking into account indirect idleness caused by shutdowns, approximately 34 million man-days were lost in 1948 by workers at striking plants, mines, etc. The 1947 figure was 34.6 million; in 1946, it was 116 million.

Glancing back over 1948, the BLS figures the drop in the total number of strikes at about 10 pct. This alone is not necessarily a reliable measuring stick since there were 20 large strikes (10,000 or more workers) last year as compared with only 15 in 1947.

But the Bureau clinches the matter by figuring further and

Work Stoppages, Selected Periods
1919—1948

PERIOD	Number of Stoppages	Workers	Man-Days Idle	
		Number (thousands)	Number (thousands)	Per Worker Involved
1948 [1]	3,300	1,950	34,000	17.0
1947	3,693	2,170	34,600	15.9
1946	4,985	4,600	116,000	25.2
1945	4,750	3,470	38,000	11.0
1935-39 average	2,862	1,125	16,900	15.1
1937	4,740	1,860	28,400	15.3
1921	2,385	1,100	[2]	[2]
1920	3,411	1,460	[2]	[2]
1919	3,630	4,160	[2]	[2]

SOURCE: Bureau of Labor Statistics, Dept. of Labor.
[1] Preliminary estimates.
[2] Not available.

finding that last year's 20 big strikes accounted for 19 million man-days lost (56 pct of total) as compared with 17.7 million lost man-days in 1947's big strikes (about 50 pct of total).

Largest of the 1948 stoppages, of course, was the 40-day shutdown of the bituminous mines over the handling of pensions, which involved 400,000 soft coal miners before it ended. A shorter strike of 8 days took out 30,000 workers in the anthracite mines.

In the automobile field, 75,000 Chrysler workers were out for about 17 days in May and 13,000 more were off for 4 days in November. Hudson was nicked for 26,000 man-days of lost time when workers stayed off the job for 2 days last March.

Other major strikes included a 142-day strike by 18,000 Boeing workers at the Seattle plane plant, the 93-day longshoremen's strike on the West Coast, and a combined loss of more than a million man-days by employees of farm machinery manufacturers.

Wages and "fringe" benefits were the major issues in last year's strikes, the BLS says. Union representation rights, the union shop, and hiring halls also figured in the stoppages.

Last year saw strikes fall back more nearly to a normal pattern, the BLS concludes. By this, it means that strikes increased in number each month from January until July and then steadily decreased to another low point in December.

Makes Graphite Purchase

Washington

• • • **The sale of** 19,800 tons of Madagascar graphite to the United States Government by French suppliers with the approval of the French Government has been announced by ECA.

The sale arrangement was made in accordance with the provisions of Article V (relating to scarce materials) of the Economic Cooperation Agreement of June 28, 1948, between the United States and France. It calls for the export of graphite to the United States at a maximum annual rate of 3000 metric tons, and was authorized by the French Government after taking into account French domestic needs and foreign trade requirements.

FORT PITT BRIDGE

. . . an organization of practical, experienced steel fabricators and erectors—long experienced in every phase of structural steel construction . . . .

. . . with excellent plant and research facilities . . . all closely co-ordinated for maximum cooperation between the architect, the engineer, the contractor and the owner. Let Fort Pitt Bridge work with you on any structural problem involving added plant facilities or new plant construction.

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Cleveland, Ohio, Bulkley Building Detroit, Michigan, New Center Bldg.

Harvester's New Foundry Pours First Hot Metal

Louisville, Ky.

• • • **International** Harvester's new foundry here poured its first hot metal Jan. 17. There are six melting cupolas in the foundry and equipment incorporates all the improvements known in modern foundry practice. The present 120 man crew and foundry supervisor will be able to produce about 50 tons of castings per 8 hr shift. All equipment and buildings are not yet finished. Harvester expects to have the foundry entirely completed by early summer and all cupolas will be placed in operation with three melting and three down for maintenance and service on alternate days.

The molding department has been mechanized and conveyors will transport castings of all weights. Attention has been given to providing clean air to the foundry and 90 million cu ft of fresh air will be drawn into the building every hour. In fact, this system makes it possible to completely change the air in the foundry every 5 min.

The National Engineering Co. of Chicago handled the design and layout of the new unit. When fully completed the Harvester officials estimate the foundry will have cost them in excess of $12 million. Design and layout was started in March, 1946, and the actual building was started in April, 1947. When operating at its peak the Louisville works foundry will require the services of about 1600 employees working on three shifts.

The floor area is approximately 335,000 sq ft. The main building which houses all departments is 1100 ft long and the maximum width 456 ft. All the gray iron castings required for production and service of the three small International Harvester Farmall tractors built exclusively at Louisville will be produced in the foundry. Present production schedules require 400 tons of good castings a day and the foundry has been designed to produce that tonnage when operated at capacity.

The majority of materials and processing in the new foundry will be handled mechanically. The completely mechanized molding department will employ three types of molding conveyor systems, one type for heavy castings, the second for castings of intermediate weight, and the third for light castings. The two unit system for heavy molds will carry castings averaging 128 lb in weight. The four unit system for intermediate molds will transport castings averaging 56 lb, while the one unit system for light molds will carry castings averaging 9 lb in weight.

"New Process"
Punches • Dies • Rivet Sets
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Chisel Blanks
Made from high-grade alloy tool steels properly heat-treated, of uniform high quality — may be purchased with complete confidence for maximum service.
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GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL ST. CHICAGO 8, ILL.

Health Service Studies 17 Typical Foundries

Washington

• • • **The U. S. Public** Health Service is making a study of 17 typical Illinois iron foundries and 1937 foundry workers in an effort to improve plant health and safety.

PHS and the Illinois Department of Public Health are conducting the study, which is described as the "most comprehensive" in the history of the foundry industry.

The investigators have so far taken about 1000 dust samples by the impinger (PHS light field) method, as well as gross samples of heap sand, facing sand, and core sand. Also collected are rafter samples and gross samples of airborne dust.

To determine the presence of iron fume or dust, samples of airborne dust were taken by the electrostatic precipitator. Tests for carbon monoxide were made during melting operations and the pouring of molten metal.

Personal protective devices, ventilation, methods of operation, and any other factors that might contribute to the entire picture of working environment all have been noted by PHS investigators, and will be included in the agency's forthcoming report.

To Make Jet Engine Parts

Schenectady

• • • **The General** Electric Co. has awarded substantial contracts for the manufacture of aircraft jet engine parts to two west coast concerns, according to C. A. Salmonsen, acting manager of G-E's Aircraft Gas Turbine Divisions.

Designed for use on the J-47 jet engine, which General Electric produces for the U. S. Air Force, the parts will be made by the Solar Aircraft and the Ryan Aeronautical companies, both of San Diego.

The San Diego-made parts will be shipped for assembly to General Electric's newly-acquired plant in Lockland, Ohio, when that plant begins operation early this year.

To Roll Aluminum Foil

Permanente, Calif.

• • • **Aluminum foil** will be rolling from the plant imported from Germany last year by The Permanente Metals Corp. within the next 3 months, it has been announced by company officials here.

Assembly and installation of the complicated mill has been in progress here for the past 6 months and trial runs are expected within a month. Coils of aluminum strip for the local operation will be shipped from the rolling mills of the company at Spokane.

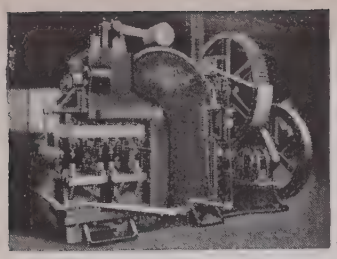
Makes New Style Bushing

Milwaukee

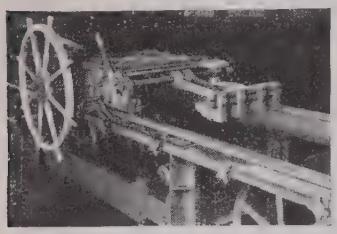
• • • **Allis-Chalmers** Mfg. Co. has developed new high voltage sidewall bushings which have reduced the tank height as much as 3 in. in 2400-v distribution transformers. This new style bushing applicable in the 5.0 kv insulation class, 100 kva and below, combines all the simple mechanical advantages of a tank-wall, stud-type bushing plus the protective advantages of a pocket-type bushing.

The new style bushing also increases production of such transformers as it eliminates the use of hard to get deep drawing steel and the necessary processes used in forming of fabrication of the pocket in the tank wall.

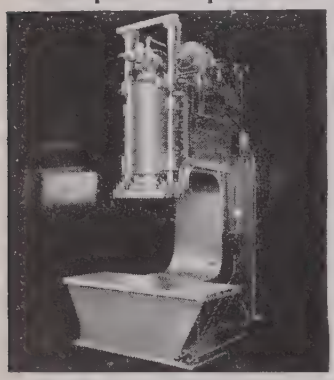
Can your Spring Coiler make this?
THE "HOUR GLASS" SPRING
TORRINGTON SPRING COILERS
have a thousand tricks up their sleeves
. . . AND EVERY ONE OF THEM SAVES YOU TIME, TROUBLE AND MONEY!
That's because these superior machines are so versatile! Their ability to turn out the most exacting spring designs — with speed, accuracy and economy — is an old story to professional springmakers everywhere. Take that "Hour Glass" spring, for example. Tough job? Sure! But this is just one of many tricky springs turned out by Torrington's W-11 Spring Coiler, with special attachments and tool arrangements. And just another example of the speed, accuracy and versatility of Torrington Spring Coilers.
For detailed information on the "Hour Glass" spring or any other complex spring problem, just drop a line to our Sales Department.
Torrington's W-11 Spring Coiler
The TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT



BEATTY No. 11-B Heavy Duty Punch widely used in railroad industry.



BEATTY Spacing Table handles beams, channels, plates with speed and precision.



BEATTY 250-Ton Gap Type Press for forming, bending, flanging, pressing.

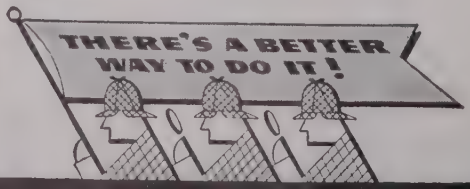
BEATTY CoPunShear, one unit does coping, punching, shearing.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.

THERE'S A BETTER WAY TO DO IT!

Our Motto

A BEATTY machine is tailor-made to do a certain job — and do it better, in less time, at less cost. Our long and varied experience in solving metal working problems enables our engineers to grasp your problem quickly, and provide a practical, proven answer. AND we can offer you real economy, too, because the range of BEATTY machines is so wide that with minor changes and careful tooling we can often provide a tailor-made machine at little more than the cost of a standard model. Let us work with your own engineers on your next production problem. Two heads are better than one, especially when they're looking for the same thing — *a better way to do it.*



HYDRAULIC HEAVY METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

Opens Detroit Roll Plant

Cleveland

• • • **Yoder Co.** has opened a branch roll plant in the Detroit area, according to John I. Lucas, president. He reported that the company found its largest prewar market in the automotive industry in Detroit.

The new branch, located at 1461 East Eight Mile Road, Ferndale, Mich., will be equipped to furnish rolls and tooling to meet the demands in that area. Operations are scheduled to start early in February.

E. C. Rosey has been appointed manager. Vernon Smith, Yoder Co., Cleveland office, has been transferred to head the Detroit office. All other personnel will be from the Detroit area. A branch sales office, managed by E. C. Murdock, has been maintained in Detroit for the past 3 years.

New Roofing Material

Chicago

• • • **A patent** covering the method of manufacturing a new corrugated roofing and siding material, sold under the trade-mark "Strongbarn," has been issued to Granite City Steel Co., Granite City, Ill., according to Hayward Niedringhaus, president. The product was perfected shortly after the war, after having been in the process of development since 1937.

The new product is made of galvanized steel. The company claims it is 56 pct stronger than conventional grades of roofing and siding, and is 21 lb per square lighter than 26 gage material, yet equal in strength.

Welders Elect Officers

Detroit

• • • **B. L. Wise,** director of production, National Electric Welding Machines Co., Bay City, Mich., has been elected president of the Resistance Welder Manufacturers Assn. Mr. Wise succeeds T. S. Long, vice-president and general manager, Taylor-Winfield Corp., Warren, Ohio, who becomes chairman of the executiv committee. T. Embury Jones, president, Precision Welder Machine Co., Cincinnati, was named vice-president of the group.

Funds Made Available For Sloan Fellowships For Young Executives

Cambridge, Mass.

• • • **Ten young** executives from various fields of business will be chosen in a national competition for a year of graduate study in the Sloan Fellowship Program for Executive Development at the Massachusetts Institute of Technology, according to Dr. James R. Killian, Jr., president of the Institute.

The opening of the competition marks the resumption after a recess during the war of a program which started in 1931, and has been supported for several years by grants from the Alfred P. Sloan Foundation, Inc. This program is a joint project of the Institute's departments of business and engineering administration and economics and social science.

The award of 10 fellowships this year is made possible by a new grant of $225,000 from the foundation to cover a program of research in the field of executive development and education for a group of outstanding young business executives.

The fellowships, awarded on the basis of merit in a nationwide competition, will carry stipends up to $4000 for married men and $3000 for single men. Recipients, on leave of absence from their employers, will be in residence at the Institute from June 10, 1949, to June 15, 1950, and will engage as a group in a special program. In selecting the total group of approximately 10 fellows, an attempt will be made to have represented a diversity of industries, size of companies, geographic areas, and types of experience.

The courses to be undertaken by the fellows are designed to capitalize upon their maturity and background and to offer an experience not otherwise readily obtainable by the young executive in industry. The practical problem approach is supplemented by study of underlying principles in the consideration of such problems as industrial relations, financial management, marketing methods and research, production, and accounting.

Handle Scrap *Faster—Easier*

This Burro is handling scrap faster and easier because it moved itself and several cars to the job quickly—and started work without delay. Burros equipped with magnet, clamshell bucket, dragline bucket, tongs or hook are saving time and money on many jobs in every type of industry. Their powerful draw bar pull (7500 lbs.) and fast travel speeds (up to 22 MPH) make them efficient switch engines too — you can spot cars where and when you want them at a moment's notice. There's no waiting time when a Burro is on your track.

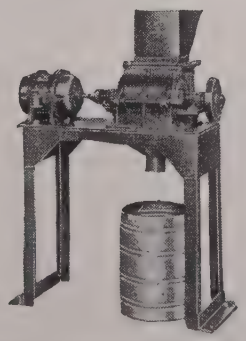
Write for Descriptive Bulletins

Cullen-Friestedt Co., 1303 S. Kilbourn Ave., Chicago 23, Ill.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

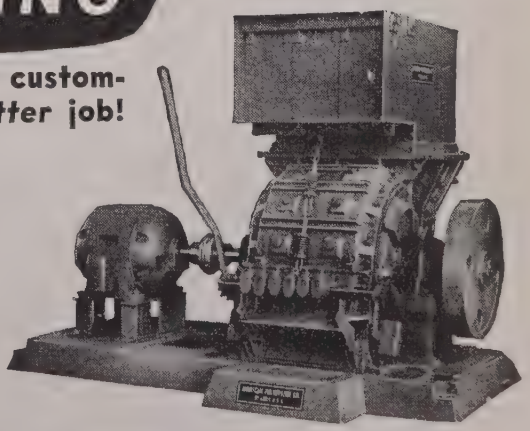
from TEST GRINDING to TONNAGE CRUSHING

AMERICANS are custom-built to do a *better* job!



AMERICAN Laboratory Size Mills

With the same reduction action as Metal Turnings Crushers (or hammer action) — American Laboratory Size Mills offer an efficient means for reducing razor blades, pewter castings and fragile, thin brittle steel to a reclaim product.



AMERICAN Metal Turnings Crushers

Bulky, hard-to-handle turnings are rapidly reduced as much as 80% with this efficient, economical crusher. And the yield of cutting oil is increased 30 to 50 gallons per ton—proof of how profitable the installation of an American Metal Turnings Crusher can be for those who handle 20 tons or more of metal turnings a month.

There's a custom-built AMERICAN for your operation—write for further data and specifications.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE.
ST. LOUIS 10, MO.

MACHINE TOOLS

. . . News and Market Activities

Auction of War Surplus Machine Tools Increases in Past Month

Plant, Dealer Sales Provide A Parody on 1946 WAA Bargain Basements

o o o

• • • **A second liquidation** of war surplus machine tools, this time by plants and dealers, may provide the machine tool industry with a pint-sized parody on WAA's bargain basements of 1946.

Notices of auctions and sales have increased substantially during the past month. Big plants, like Sperry Gyroscope Co. in the east, and smaller plants are selling some of the war surplus machine tools, in many cases at a good profit. It is evident that the dew is off the daisy.

As early as 1945, a Warner & Swasey Co. sales executive predicted the development of a surplus apart from government-owned stocks. During the early part of the war, many plants bought machine tools with private capital. Later, they acquired equipment by lease. WAA's low prices more or less prevented the development of this privately-owned potential surplus until the postwar pipelines were filled up. Apparently, this is now the case.

As a parallel, many machine tool dealers acquired considerable stocks of machine tools, both from WAA and plants, hedging against the postwar price spiral which they knew would affect machine tools. Thus, apparently, the initial phase of the unloading of another surplus is under way.

Industry observers believe the potential proportions of this surplus to be large. If so, they report, it will have a possible deleterious effect on the sale of new machine tools.

On other fronts there was little action this week. ECA is still slow and the National Defense Program, according to authoritative industry sources, has done everything but live up to its advance build-up as a big source of machine tool orders. Spread of ECA orders seems to be fairly even. Some plants have three, four or five machines on order through these channels, and in most cases, $100,000 will cover the order at most individual plants. At the same time, pressure to buy locally is mounting in European markets. Best bet for the United States machine tool builders, according to trace gossip, is Italy.

France, where the syndicate of machine tool importers has some $95 million in firm orders for machine tools, reduced the $6 million tentative allotment for the last quarter of 1948 and the first quarter of 1949 to $4 million. However, $750,000 in spare parts orders have been placed. Plans now call for $1,300,000 for machine tools in the third quarter.

In Detroit, the machine tool industry as a whole had another slow week. Requests for quotations on new equipment continue to come in, but new commitments have been few and far between. During the past week there have been some delays reported on both Oldsmobile and Cadillac orders, which had appeared to be ready for finalization. Some GM research technical center buying has been reported, but anticipated ordnance business continues in abeyance. Buying by Detroit tool and die shops, with few exceptions, is practically nonexistent, according to sources here.

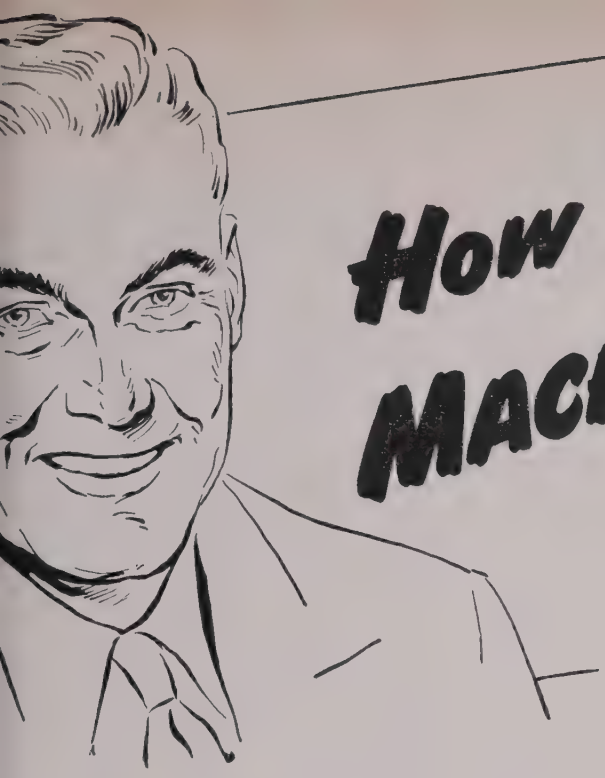
Some requests have come in for quotations on new equipment for Detroit transmission, it is reliably reported. Meanwhile, tool and die activity here is at very low levels. At the moment, the brightest spots on the machine tool horizon appear to be honing and welding equipment, which continue to be in fair demand, according to industry sources.

In Philadelphia, Westinghouse is submitting a small group of "guinea-pig orders" to get the Navy's acceptance. Although it had been decided not to check JANMAT, there is always the possibility that Navy brass might change its mind.

The program for the Kansas City gas turbine plant involves 2000 tools at a total cost estimated at $5 million. This does not, however, include the cost of tooling and fixtures. Dealers in Philadelphia are finding government buying to be a larger and larger factor in the tool market. Government requests for quotations on the Naval ordnance plant at Silver Springs, Md., have gone out. The White Oaks Naval ordnance laboratory will involve 40 to 50 tools.

Builders and dealers find that private tool buyers are very uncertain as to capital expenditures. In most instances 1949 budgets have not yet been approved. There are factors in addition to the uncertain industrial situation that have also contributed to this nervous apprehension of business leaders. The principal one is the possibility of an excess profits tax, but another important factor is the concern over labor's reaction to the abandonment of the Taft-Hartley act.

In Bridgeport, the Diamond Machine Co., Stratford, Conn., has acquired control of the bankrupt Bridgeport Safety Emery Wheel Co. and submitted for court approval a plan for future operations, according to announcement by John Kilbride, president, Diamond Machine Co. The plan provides for payment of 13½ pct to creditors, all secured claims to be paid and compensation for trustee-receiver liabilities and administrative expenses. Control of the emery wheel company was acquired through purchase of company stock, subject to court approval and will involve expenditure of approximately $250,000. Liabilities were placed at more than $2 million and assets appraised at $233,000, when bankruptcy status was set a few months ago. Operations will be resumed at the emery wheel plant on a limited basis.



How much do MACHINE MINUTES cost you?

Figure your machining speeds — your operator time — your daily requirements — and your down-time. It will show you why more and more smart production men are turning to the No. 12 Hydraulic for a consistent volume of work.

GISHOLT No. 12 HYDRAULIC AUTOMATIC LATHE

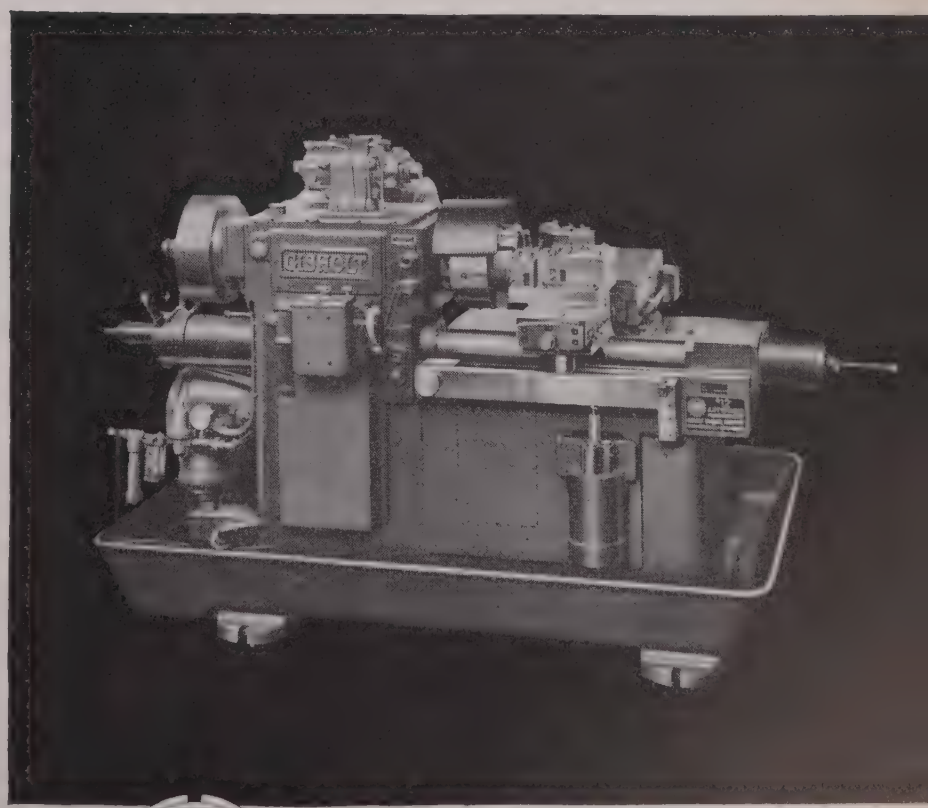
These are important factors in cutting the cost of machine minutes—and in cutting the unit cost of many parts.

Easier Job Set-ups—No cams or drums. All adjustment points for slide control are conveniently placed between shoulder and knee levels—open and accessible. Tool blocks and tool bits are simple to position. There's no time lost here.

Faster Machining—This advanced automatic lathe has the speed and ruggedness for the toughest high production work.

Easy to Operate—One operator can tend two or more machines. Tool bits are quickly adjusted or replaced during runs.

Simple Construction—There are fewer parts requiring adjustment or replacement. You expect less and have less down-time with the No. 12 Hydraulic. Write for the catalog—Form 1104A.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
MADISON 10, WIS.

NONFERROUS METALS

. . . News and Market Activities

Imports of Aluminum and Lead Continue in Growing Tonnages

New York

• • • **The fundamental inconsistency** of continuing imports of aluminum and lead coming into the United States from western European nations who are receiving these metals under Economic Cooperation Administration dollar grants has been lost sight of in the welter of confusion of press reports on a study made jointly by ECA and the Dept. of Commerce.

The two agencies cleared without reservation, in the report of this study, the United Kingdom, the Netherlands and Belgium of suspicion that Marshall Plan aluminum and lead were resold to the United States by their nationals.

Domestic aluminum and lead producers have never raised any question about return shipments of the identical metal shipped to Europe under ECA authorizations. Nor has there been any attempt to charge any western European nation with direct responsibility for exports of aluminum and lead to the United States. Domestic producers merely pointed out that cross-haul shipments of these metals indicated that the tonnages authorized for ECA purchase by western European nations were excessive as long as these surplus export tonnages were available to be made use of by foreign consumers.

Imports of aluminum and lead are continuing and growing in tonnage. During the week of Jan. 27, for example, 7.9 million lb. of aluminum reached the United States from western Europe. Recognizing the shortage of aluminum, and formerly lead, in the United States, traders in Europe have found it possible to convert aluminum and lead into United States dollars. It would not have been possible for this metal to have been exported if the tonnages of aluminum and lead authorized for western Europe had not been in excess of the needs of these countries.

Specific Countries Cleared of Suspicions That MP Metals Are Resold

° ° °

The countries of Western Europe exported to the United States in the period from April to October 65,206,153 lb. of scrap aluminum, 3,754,430 lb. of ingot and 1,135,284 lb. of sheet according to the offiicial Dept. of Commerce publication of "United States Imports for Consumption of Merchandise."

U. S. Imports of Aluminum April to October, 1948 in pounds

	Scrap	Ingot	Sheet
United Kingdom	34,616,145	1,751,118	428,638
Germany	10,120,141	.....	.....
Netherlands	6,269,993	.....	703,083
Switzerland	.....	1,512,392	3,563
Belgium	2,037,503	50,000	.....
Italy	8,340,211	.....	.....
Sweden	3,822,160	.....	.....
Norway	.....	440,920	.....

Authorizations of aluminum to Western European nations to date total 185,956 net tons, of which 86,545 tons were authorized on Nov. 15, 11 days after the initial protest by the aluminum industry was made to ECA officials. So far there has been no specific explanation as to why the foreign aluminum cannot be used by Western European consumers. General statements to this effect have been made, but the fact is that the metal being imported into the United States is being used in this country to make the same type of products as are being made in Western Europe from ECA aluminum.

Public housing in England, for example, used 28,200 long tons of aluminum in 1948 to the end of November, of which only 5500 tons was virgin metal. But private housing in England in the same period required 27,800 tons of aluminum, of which 22,735 tons was virgin metal. There is no apparent reason why Western European industry cannot make use of the tonnages of scrap and ingot aluminum now being exported to this country.

From the standpoint of domestic producers and consumers of aluminum some portion of the aluminum being financed by ECA shipments is not needed for industrial recovery and reconstruction. The ECA program is making it possible for some European Countries to develop a synthetic and artificial aluminum mill products industry.

Aluminum sheet is already beginning to come into the United States in heavier tonnages. This product can only be competitive with domestic sheet production as long as there is ECA aid to sustain the flow of cheap ingots. A significant question is whether it is the purpose of the ECA program to build up foreign industries which have no prospect of standing on their own feet.

Nonferrous Metals Prices

	Feb. 2	Feb. 3	Feb. 4	Feb. 5	Feb. 7	Feb. 8
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper, electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$90 to $92
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$89 to $93
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.198
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	19.00*	22.00
No. 120	18.50*	21.50
No. 123	18.00*	21.00
80-10-10 ingot		
No. 305	....	27.25
No. 315	....	24.25
88-10-2 ingot		
No. 210	....	33.00
No. 215	....	31.00
No. 245	23.25*	25.75
Yellow ingot		
No. 405	16.50*	17.50
Manganese bronze		
No. 421	....	23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	28.75-29.25
0.60 copper, max.	28.50-29.00
Piston alloys (No. 122 type)	24.75-25.25
No. 12 alum. (No. 2 grade)	24.00-24.50
108 alloy	24.50-25.00
195 alloy	24.75-25.25
13 alloy	28.75-29.25
AXS-679	24.50-25.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	26.25-26.75
Grade 2—92 pct-95 pct	25.00-25.50
Grade 3—90 pct-92 pct	24.00-24.50
Grade 4—85 pct-90 pct	23.25-23.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅜
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	20.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls, frt allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	....	37.18
Copper, hot-rolled	....	33.03	....
Copper, drawn	....	34.28	....
Low brass	38.37*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass	....	29.24	....
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver, 10 pct	....	47.17	44.77
Architectural bronze	33.42	....	....

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅜
Yellow brass	18⅞	18¼
Red brass	20	19¼
Commercial bronze	20⅛	19⅜
Manganese bronze	18¾	17⅞
Leaded brass rod ends	18½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	20.00-20.25
No. 2 copper wire	19.00-19.25
Light copper	18.00-18.25
Refinery brass	18.00-18.25

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	14.50-15.00
No. 1 comp. turnings	14.25-14.75
Rolled brass	12.75-13.25
Brass pipe	13.25-13.75
Radiators	13.75-14.00
Heavy yellow brass	12.00-12.25
Aluminum	
Mixed old cast	14.25-14.50
Mixed old clips	14.25-14.75
Mixed turnings, dry	13.50-13.75
Pots and pans	14.50-15.75
Low copper	17.75-18.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18 —18½
No. 2 heavy copper and wire	17 —17½
Light copper	16 —16½
Auto radiators (unsweated)	11 —11¼
No. 1 composition	13 —13¼
No. 1 composition turnings	12¾—13
Clean red car boxes	11 —11¼
Cocks and faucets	11 —11¼
Mixed heavy yellow brass	8 — 8½
Old rolled brass	10½—11
Brass pipe	11½—12
New soft brass clippings	15 —15½
Brass rod ends	11½—12
No. 1 brass rod turnings	8½— 9

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcases	10 —10½
2S aluminum clippings	14 —14½
Old sheet and utensils	10 —10½
Borings and turnings	5 — 5½
Misc. cast aluminum	10 —10½
Dural clips (24S)	10 —10½

Zinc

New zinc clippings	10½—11
Old zinc	9 — 9½
Zinc routings	5¼— 5¾
Old die cast scrap	5½— 6

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½

Lead

Soft scrap lead	14½—15
Battery plates (dry)	7¾— 8

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5½

Miscellaneous

Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	16 —16½
Solder joints	20 —21
Siphon tops	50 —52
Small foundry type	18 —18½
Monotype	17 —17½
Lino. and stereotype	16 —16½
Electrotype	14 —14½
New type shell cuttings	15 —15½
Hand picked type shells	6 — 6½
Lino. and stereo. dross	8½— 9
Electro. dross	6 — 6½

Here's a Crane that's Tailor Made for Handling SCRAP!

Special Axle:
New type axle has been increased in width and height. Multiple-hinged shoes have been increased in width from 20" to 24". The new UNIT 1020A now has equal stability over both sides and ends. Handles a 45" Magnet with ease.

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- New leak-proof Oil Seals . . . keeps lubricants in . . . and dirt and abrasives out.
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Swing Lock Control:
Hand operated swing lock control within easy reach of operator . . . no more stooping, kicking, or leaving cab for this operation.

New Type Magnet Fairlead:
This elevated Fairlead is especially adapted for magnet operation. It equalizes cable contact on two sheaves instead of one, minimizes unnecessary wear.

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Heavy Melting Grades Slip; Market Weak

New York

• • • Scrap prices hit the skids further this week. Some mills came back into the market with light purchases to give some indication as to what the price status might be in those districts. Other districts, however, still have to rely upon broker purchases to determine what going prices might be as mills stay out of the market.

No. 1 heavy melting dropped an average of $4.50 a ton in Chicago and $2 a ton in Philadelphia and Pittsburgh. Some of the minor market areas followed suit. Everywhere the market, however, maintained a weak tone. Some felt that these prices would hold for a time, while others ventured that the leveling off would take place at still lower prices.

Cast grades were off again, but not in the proportions of recent weeks. Sales are few and far between and in small volume. Under conditions such as the present, even small sales reflect market conditions because of the veil of uncertainty that surrounds the entire market itself.

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PITTSBURGH — The heavy melting grades are down in this market this week. A firm offer of a substantial tonnage of No. 2 steel has been made for $37 a gross ton. Lack of demand and certainty of a drop in price of earmarked No. 1 heavy melting plus a complete appraisal of the market has also brought this grade down $2 a ton. Conditions here reflect those existing in all other market areas.

•

CHICAGO—Light purchases last week by Inland and Carnegie partially clarified the market. The tonnages bought were extremely light, but in the absence of other sales these purchases made the market. Turning prices still appear to be extremely weak. Railroad specialties continue their downward adjustment. Companies specializing in buying scrap railroad cars for demolition have pulled out of the market. Prices on items coming from such cars are so highly problematical that these car buyers don't know what to quote on the worn out retired cars. Carnegie Illinois steel told IRON AGE that they will continue to accept earmarked customer scrap at the new price of $37 a gross ton delivered. Thus the completion of the first step down from the former gold plated market prices has paused temporarily at $7 off the high point reached last year. The market may stay at present levels for a while. Yards report much less scrap coming in, many plants are slowing up on production and winter has finally frozen out the supplies from the country. One significant factor has taken place. No mills will buy No. 1 heavy melting from a dealer. Therefore, this item cannot be considered a yard item. The mills are insisting that their No. 1 scrap come from industry and they are enforcing the differential between dealer and industrial scrap to the letter.

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PHILADELPHIA—One mill reentered the market last week and bought a tonnage of No. 1 melting at $40. Another entered the market for a small tonnage of No. 2 at $35. Other mills are still out of the market. Turnings were bought at $31.50. A small tonnage of No. 2 bundles has been sought at $32 to the dealer, but they are backing away. Electric furnace grade of low phos has been bought at $43. Pipe mills continue out of the market, but heavy breakable has been bought at $45. Foundry grades are still inactive. It is learned that mills are not willing to continue to pay formula prices for railroad scrap. Foreign scrap is still coming into this market, and mills are generally waiting further market developments before placing orders.

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CLEVELAND—Mills are out of the market, reducing inventory and probably will not be back in the market until Mar. 1. Blast furnace and foundry grades are very weak, and only a minimum of interest is being shown in electric furnace and openhearth material. A few high priced orders are still out, which accounts for a good part of the present market activity. Buyers backed off from railroad offerings, and the market is now waiting to see what the Eastern railroads tonnage will bring. Copperweld Steel Co., Warren, Ohio, is paying a flat $47.50 for low phos delivered plant.

•

DETROIT—With a large local mill coming back into the market this week at $34 delivered, some of the confusion in the local market has cleared. However, a lack of sales of blast furnace material has only added to the confusion in this segment of the market which has been created by the refusal of steel mills to accept blast furnace grades. Turnings are weaker again this week on the basis of local sales and legitimate offers to sell. Cast iron prices have been reduced again. A sale by Fisher Body of heavy breakable brought $40 a ton Detroit, it is reported. There are indications that a differential will be established here soon between No. 1 and No. 2 heavy melting.

CINCINNATI—To all appearances, major consumers here wouldn't care if the tonnage in this market were on a slow boat to China. Some tonnage moving on old orders is being accepted selectively, or canceled. Foundries are buying only small tonnages. Mills are giving no indications as to what their next move will be and brokers have clammed up on their offerings, probably to keep prices, in the absence of actual orders, from weakening further. It is likely, however, that mills will buy under prices currently quoted when they come back in.

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NEW YORK—Prices dropped further in a market that shows signs of falling apart at the seams. Isolated sales are reported this week with a few mills coming back into the market at lower prices. The heavy melting grades are down about $3 a ton with the lighter grades dropping sympathetically. Only sales in the cast grades were on heavy breakable which sold for $42 delivered Coatesville. There is a general weakness in the market which indicates even a further decline in current prices as mills show a tendency to reenter the market. Chemical borings are not moving; there are no orders or sales and quoted prices are nominal.

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BOSTON—Prices on all grades of scrap tumbled further down the ladder with No. 1 heavy melting selling at $31 to $32. The lighter grades along with No. 2 heavy melting fell back to $29.50 to $30. Cast grades fell completely apart. No. 1 and No. 2 Machinery cast dropped $8 a ton with even bigger drops in heavy breakable and stove plate being recorded.

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BIRMINGHAM—Prices continue to drop here even though trading is at the lowest point in months. No. 1 and No. 2 heavy melting steel have dropped $2.50 and the $1 differential between No. 2 heavy melting and No. 2 bundles has been restored. Buyers have tightened up on specifications and unstripped motor blocks are being accepted no longer by pipe shops and foundries.

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BUFFALO—The market looks sick again this week. Blast furnace and openhearth grades are off from $1 to $2 a ton. Cast grades are down $2 to $4 without a trace of worthwhile business in sight. No. 1 sold at $41 to $43, No. 2 at $36 to $37 and machine shop turnings at $32 to $33. Railroad specialties were clipped for $4 with conflicting reports on New York Central list prices resulting. One source reported that a bid of $41 on low phos was rejected while another said that the item sold at $45.25. One of the leading consumers intimated that the market for No. 2 heavy melting was $35, but declined to buy at that figure.

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ST. LOUIS—The scrap iron market in the St. Louis industrial district continues to decline and the tone is still weak, as steel mills and foundries remain out of the market to void increasing their already ample inventories. Unusually severe winter weather has slowed up shipments.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	36.50 to 37.00
RR. scrap rails	53.00 to 54.00
Rails 2 ft and under	55.50 to 56.50
No. 1 comp'd bundles	38.50 to 39.00
Hand bdld. new shts.	38.50 to 39.00
Hvy. axle turn.	38.00 to 38.50
Hvy. steel forge turn.	38.00 to 38.50
Mach. shop. turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Mixed bor. and turn.	33.00 to 33.50
Cast iron borings	34.00 to 34.50
No. 1 mach. cast	58.00 to 59.00
Mixed yard cast	48.50 to 50.00
Hvy. breakable cast	47.00 to 48.00
Malleable	60.00 to 61.00
RR. knuck. and cup	52.00 to 53.00
RR. coil springs	52.00 to 53.00
RR. leaf springs	52.00 to 53.00
Rolled steel wheels	52.00 to 53.00
Low phos.	45.00 to 45.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 dealers' bundles	32.00 to 33.00
Bundled mach. shop turn.	28.00 to 29.00
Galv. bundles	27.00 to 28.00
Mach. shop turn.	26.00 to 27.00
Short shov. turn.	28.00 to 29.00
Cast iron borings	29.00 to 30.00
Mix. borings and turn.	26.00 to 27.00
Low phos. hvy. forge	42.00 to 43.00
Low phos. plates	39.50 to 41.00
No. 1 RR. hvy. melt.	38.00 to 39.00
Rerolling rails	49.00 to 50.00
Miscellaneous rails	42.00 to 43.00
Angles & splice bars	40.00 to 41.00
Locomotive tires, cut	42.00 to 43.00
Cut bolster & side frames	40.00 to 41.00
Standard stl. car axles	60.00 to 62.00
No. 3 steel wheels	41.00 to 42.00
Couplers and knuckles	40.00 to 41.00
Rails, 2 ft and under	47.00 to 48.00
Malleable	58.00 to 60.00
No. 1 mach. cast	48.00 to 50.00
No. 1 agricul. cast	46.00 to 48.00
Heavy breakable cast	45.00 to 47.00
RR. grate bars	41.00 to 42.00
Cast iron brake shoes	43.00 to 44.50
Cast iron car wheels	48.00 to 49.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$33.50 to $34.00
No. 2 hvy. melting	33.50 to 34.00
No. 1 bundles	33.50 to 34.00
No. 2 bundles	33.50 to 34.00
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	30.50 to 31.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	28.50 to 29.00
Low phos. 18 in. under	41.00 to 43.00
No. 1 cupola cast.	48.00 to 50.00
Hvy. breakable cast.	40.00 to 42.00
Rails 18 in. and under	52.00 to 54.00
Rails random length	44.00 to 46.00
Drop broken	53.00 to 55.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.50 to 30.00
Nos. 1 and 2 bundles	29.50 to 30.00
Bushelings	29.50 to 30.00
Shoveling turn.	27.00
Machine shop turn.	$25.00 to 26.00
Mixed bor. and turn.	25.00 to 26.00
Cl'n cast chem. bor.	29.00 to 30.00
No. 1 machinery cast.	40.00 to 43.00
No. 2 machinery cast.	37.00 to 40.00
Heavy breakable cast.	32.00 to 35.00
Stove plate	36.00 to 39.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	32.00 to 33.00
New busheling	32.00 to 33.00
Flashings	32.00 to 33.00
Mach. shop turn.	21.00 to 22.00
Machinery cast	48.00 to 50.00
Mixed yard cast	43.00 to 45.00
Shoveling turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Mixed bor. & turn.	21.00 to 22.00
Low phos. plate	37.00 to 38.00
Heavy breakable cast.	37.00 to 40.00
Stove plate	42.00 to 45.00
Automotive cast.	48.00 to 50.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	33.00 to 33.50
Mach. shop turn.	31.00 to 31.50
Shoveling turn.	32.00 to 32.50
Mixed bor. and turn.	31.00 to 31.50
Clean cast chemical bor.	32.00 to 34.00
No. 1 machinery cast.	45.00 to 47.00
No. 1 mixed yard cast.	44.00 to 45.00
Hvy. breakable cast.	44.00 to 45.00
Hvy. axle forge turn.	39.00 to 40.00
Low phos. acid openhearth	41.00 to 42.00
Los phos., electric furnace	42.00 to 43.00
Low phos. bundles	39.00 to 40.00
RR. steel wheels	48.00 to 49.00
RR. coil springs	48.00 to 49.00
RR. malleable	51.00 to 52.00
Cast iron carwheels	52.00 to 53.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	33.00 to 34.00
Bundled sheets	33.00 to 34.00
Mach. shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Locomotive tires, uncut	40.00 to 41.00
Mis. std. sec. rails	42.00 to 43.00
Steel angle bars	46.00 to 47.00
Rails 3 ft and under	48.00 to 50.00
RR. steel springs	44.00 to 45.00
Steel car axles	60.00 to 62.00
Brake shoes	43.00 to 45.00
Malleable	55.00 to 57.00
Cast iron car wheels	50.00 to 52.00
No. 1 machinery cast	48.00 to 50.00
Hvy. breakable cast.	45.00 to 47.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.50
No. 2 hvy. melting	32.50
No. 2 bundles	31.50
No. 1 busheling	32.50
Long turnings	24.00
Shoveling turnings	26.00
Cast iron borings	26.00
Bar crops and plate	$37.00 to 37.50
Structural and plate	37.00 to 37.50
No. 1 cupola cast.	42.00 to 43.00
Stove plate	40.00 to 41.00
No. 1 RR. hvy. melt.	36.00
Steel axles	57.00 to 58.00
Scrap rails	42.00 to 44.00
Rerolling rails	50.00 to 53.00
Angles & splice bars	40.00 to 42.00
Rails 3 ft & under	40.00 to 42.00
Cast iron carwheels	61.00 to 63.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	37.50 to 38.00
No. 2 bundles	35.50 to 36.00
Mach. shop turn.	31.00 to 32.00
Short shov. turn.	32.00 to 33.00
Cast iron borings	31.00 to 32.00
Low phos.	44.00 to 46.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 31.50
No. 2 bundles	31.00 to 31.50
Mach. shop turn.	25.00 to 26.00
Mixed bor. & turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Machinery cast.	41.00 to 42.00
Mixed yard cast.	39.00 to 40.00
Heavy breakable cast.	36.00 to 37.00
Charging box cast.	36.00 to 37.00
Unstrp. motor blks.	35.50 to 36.50
Cl'n cast chem. bor.	30.00 to 31.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $43.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	36.00 to 37.00
Mach. shop turn.	32.00 to 33.00
Shoveling turn.	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Mixed bor. and turn.	32.00 to 33.00
Clean auto. cast.	54.00 to 55.00
Mixed yard cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
RR. malleable	70.00 to 75.00
Small indus. malleable	40.00 to 42.00
Low phos. plate	42.00 to 44.00
Scrap rails	50.00
Rails 3 ft & under	56.00 to 57.00
RR. steel wheels	49.00 to 50.00
RR. coil & leaf spgs.	49.00 to 50.00
RR. knuckles & coup.	49.00 to 50.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $38.50
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	37.00 to 37.50
No. 1 busheling	37.00 to 37.50
Drop forge flashings	37.00 to 37.50
Mach. shop turn.	27.50 to 28.00
Shoveling turn.	29.50 to 30.00
Steel axle turn.	37.00 to 37.50
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Low phos. 2 ft and under	42.00 to 43.00
No. 1 machinery cast.	50.00 to 52.00
Malleable	53.00 to 55.00
RR. cast.	50.00 to 52.00
Railroad grate bars	48.00 to 50.00
Stove plate	49.00 to 50.00
RR. hvy. melting	41.00 to 41.50
Rails 3 ft and under	55.00 to 56.00
Rails 18 in. and under	56.50 to 57.50

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	40.00 to 42.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft. under	$32.00 to 38.00
No. 1 cupola cast.	40.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$30.00 to $33.50
Elec. fur. 1 ft and under	36.50 to 40.00
No. 1 cupola cast.	40.00 to 40.50
RR. hvy. melting	30.00 to 32.50

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechnical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00*
No. 2 cast.	44.00 to 45.00*

*Ceiling Price.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Feb. 8, 1949	Feb. 1, 1949	Jan. 11, 1949	Feb. 10, 1948
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: (per gross ton)	Feb. 8, 1949	Feb. 1, 1949	Jan. 11, 1949	Feb. 10, 1948
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$44.61
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	49.46	49.46	49.46	43.28
No. 2, Birmingham	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	39.00
Basic del'd Philadelphia*	50.76	50.76	50.76	44.11
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese‡	161.40	161.40	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.
* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	*$38.75*	$40.75	$40.75	$40.50
Heavy melt'g steel, Phila.	*39.50*	41.50	42.50	41.50
Heavy melt'g steel, Ch'go	*34.50*	39.00	39.50	39.50
No. 1, hy. comp. sh't, Det.	*32.50*	33.50	38.00	35.50
Low phos. Young'n	45.25	45.25	47.00	45.25
No. 1, cast, Pittsburgh	58.50	58.50	68.00	58.50
No. 1, cast, Philadelphia	*46.00*	49.00	62.50	64.00
No. 1, cast, Chicago	*49.00*	51.00	61.00	64.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.25	$15.25	$17.00	$12.50
Foundry coke, prompt	16.75	16.75	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	12.00
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Feb. 8, 1949	3.75628¢ per lb.	$46.74 per gross ton	*$37.58* per gross ton
One week ago	3.75628¢ per lb.	$46.74 per gross ton	$40.42 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$40.92 per gross ton
One year ago	3.24816¢ per lb.	$40.17 per gross ton	$40.50 per gross ton

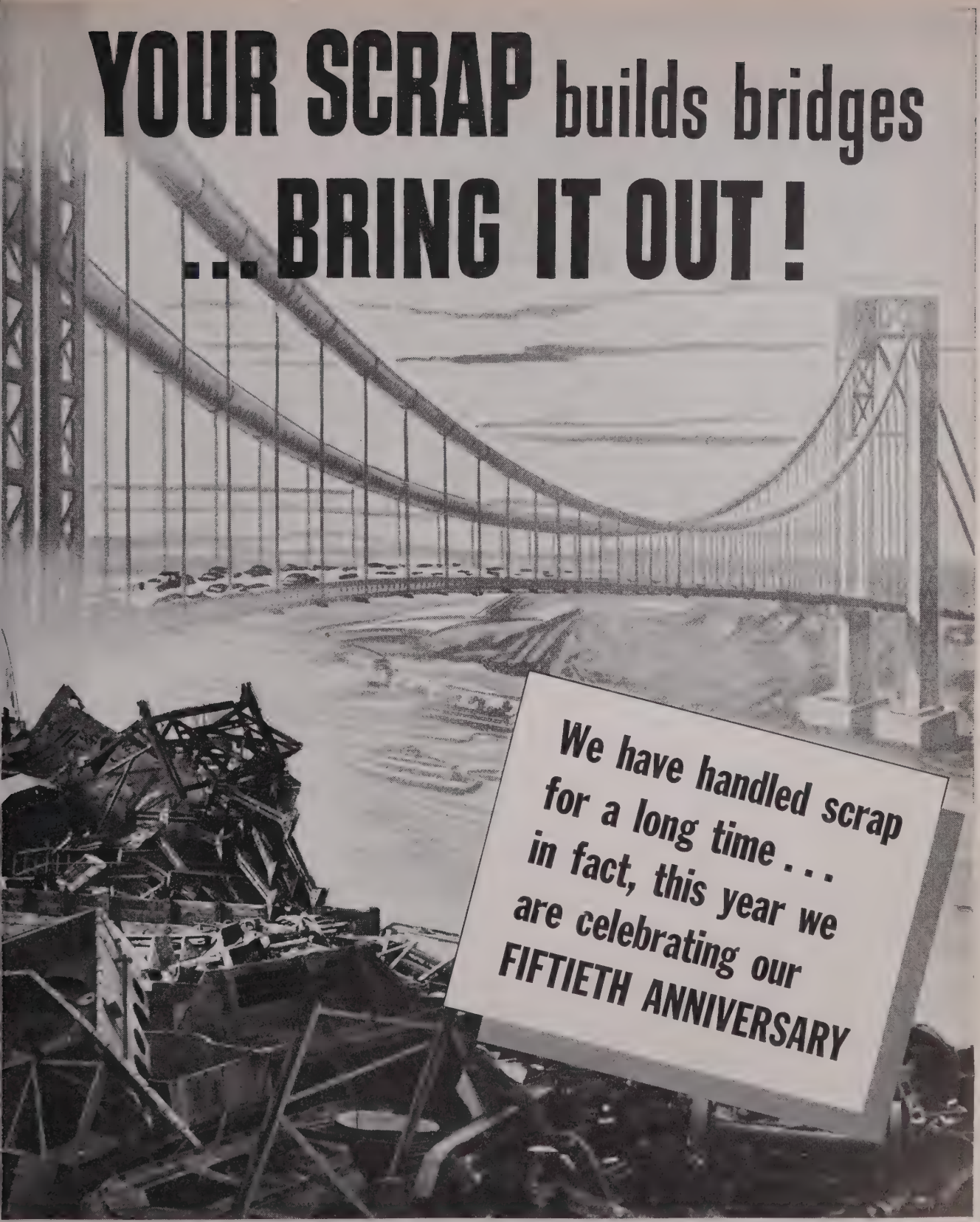
	HIGH		LOW		HIGH		LOW		HIGH		LOW	
1949	3.75628¢	Jan. 1	3.75628¢	Jan. 1	$46.82	Jan. 4	$46.74	Jan. 25	$43.00	Jan. 1	$37.58	Feb. 8
1948	3.75700¢	July 27	3.22566¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.19541¢	Oct. 7	2.87118¢	Jan. 7	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.83599¢	Dec. 31	2.54490¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.44104¢	Oct. 2	2.54490¢	Jan. 2	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5	$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.29176¢		2.29176¢		23.61		23.61		$19.17		$19.17	
1942	2.28249¢		2.28249¢		23.61		23.61		19.17		19.17	
1941	2.43078¢		2.43078¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50	Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75	Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50	Dec. 29
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

YOUR SCRAP builds bridges
...BRING IT OUT!



SCHIAVONE-BONOMO CORP.

FOOT OF JERSEY AVE., JERSEY CITY, N. J., U. S. A.

Cable Address: "SCHIABO," NEW YORK

HARRISON, N. J. • NEWARK, N. J. • BROOKLYN, N. Y. • BRONX, N. Y. • STAMFORD, CONN.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00		4.00	4.00	4.00		New Haven 4.50 Warren =4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal.=$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon=3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon=4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	Cons hohocken	3.40 =3.95	3.45 Coatesville=3.75, Claymont=3.95 Geneva=3.40, Harrisburg=6.50				3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55				Cons hohocken =4.55							
Alloy	4.40	4.40							Coatesville=5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem=3.30, Geneva, Utah=3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth=4.15, Worcester=4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester=5.50 New Haven, Trenton=5.50				5.20	Duluth= 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25–26.50	24.25–26.50	26.25–28.75	25.50–27.75	39.00–42.75	32.75–35.75	19.50–21.50	20.00–21.75	20.00–21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50–40.75	37.50–40.75	39.50–43.00	39.50–43.00	53.00–57.25	50.00–54.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50–30.75	33.00–33.50	36.50–39.50	35.00–35.75	55.00–57.25	48.50–50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium	52¢
Oil hardened manganese	29¢
Special carbon	26.5¢
Extra carbon	22¢
Regular carbon	19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.20†
Joint bars, 100 lb	4.25
Light rails (from billets) per 100 lb	3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburgh, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
†CF&I and Inland, $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.25	6.35
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	5.15	5.25
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	.....	6.35
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	.....	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	.....	5.40
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	.....	.....

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
½-in.	43 to 41	20 to 18
¾-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3-in.	39½	21½
3½ to 6-in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in.	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
½-in.	+20½	+52½
¾-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld			
½-in.	42	to 40	20½ to 18½
¾-in.	46	to 44	24½ to 22½
1-in.	48	to 46	27½ to 25½
1¼-in.	48½	to 46½	28 to 26
1½-in.	49	to 47	28½ to 26½
2-in.	49½	to 47½	29 to 27
2½ to 3-in.	50	to 48	29½ to 27½
Steel, lapweld			
2-in.	39½		18½
2½ to 3-in.	44½		23½
3½ to 6-in.	48	to 44	23 to 27
Steel, seamless			
2-in.	37½	to 32½	16½ to 11½
2½ to 3-in.	41½	to 36½	20½ to 15½
3½ to 6-in.	45		24
Wrought Iron, buttweld			
½-in.	+16		+46½
¾-in.	+ 9½		+39½
1 to 2-in.	— 1½		+28½
Wrought Iron, lapweld			
2-in.	+ 4½		+33
2½ to 4-in.	— 5		+21½
4½ to 6-in.	— 1		+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages) — *Pct Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	*Base price per net ton*
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	31.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	28.00¢
Manganese	60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.153
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$15.00 to $15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $17.50
Foundry, Byproduct	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	23.35
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	21.05
Swedeland, Pa., f.o.b.	21.00
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads, Per 1000

First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ — $12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7.10	4.85-5.30	6.52-6.68	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.03	5.93	7.27	5.03	6.80-6.86	5.28	5.08	5.08	5.88	9.38	9.63	10.83	11.08
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85	5.75	7.70	5.34	6.35	5.35	5.10	5.05	5.90	9.73	9.98	11.18	11.43
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[5]	5.82-6.21[5]	6.97-7.65	5.25-5.62[5]	6.31	5.50-5.71[5]	5.30-5.47[5]	5.30-5.62[5]	6.06-6.17[5]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.44	6.34	7.33-7.74	5.44	....	5.69	5.49	5.49	6.29	9.94	10.13	11.39	11.64
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	....	6.45	5.05[11]	6.68	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40	....	8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.90	6.60-6.66	9.35[5]	6.10-7.40	5.75-5.90	6.05	7.85[15]-8.45	10.90	10.85	12.40	12.65
San Francisco	5.95[6]	7.15[2]	8.25-8.90	6.75[6]	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2]-8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65-8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	42.88	43.38	.....	.....	.....
Buffalo	47.00	47.00	47.50	.....	.....
Chicago	46.00	46.00	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	52.75	53.25	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	62.00	62.50	.....	.....	.....
Lone Star, Texas	.....	75.00†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Provo	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	.....	.....	.....	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	52.75	53.25	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	.....	.....	.....	.....
Cincinnati	Birmingham	6.09	48.97	49.43	.....	.....	.....
Jersey City	Bethlehem	2.39	50.39	.....	.....	.....	.....
Los Angeles	Provo	6.93	52.93	53.43	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Provo	6.93	52.93	53.43	.....	.....	.....
Seattle	Provo	6.93	52.93	53.43	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....

† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $125 per ton for each additional 0.50 pct Si up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus, $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Ci	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25%Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.90¢
Ton lots	9.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.: freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25

Sykes Expects German Steel Output to Reach the 10 Million Ton Rate This Year

Chicago

• • • **Wilford B. Sykes** expects the German steel industry to reach the full production tonnage allowed some time this year. If they reach this goal of roughly 10 million tons it will better 1948 by about 4 million tons. Mr. Sykes, president of Inland Steel Co., just returned from a one man investigating tour sponsored by the U. S. Army. He told an industrial trade press conference that the Germans appear to have the necessary coal, scrap, ore and power to reach the maximum tonnage some time this year.

The first, and most important thing, which must be done immediately, Mr. Sykes said, is to permit German mills to directly control their source of coal, coke, semifinished, etc. Under the previous setup each mill had to enter into long drawn out negotiations to obtain their raw materials. Mr. Sykes believes that as soon as these mills are again given direct control of their needed raw materials, production will climb in a hurry. He pointed out the difficulties of scheduling and maintaining steel production when the delivery of the essential raw materials needed are constantly subject to question or delays over which the various mills have no immediate control.

For the most part German equipment is vastly inferior to ours. The only modern continuous sheet and strip mill the Germans owned went to Russia as reparations. Mr. Sykes reported that the workers are willing and able to work. Food is still a big problem, however. The average German diet, the Inland executive said, is at the barest minimum to sustain weight and health of industrial employees. Mr. Sykes told the news men that American bombers leveled the buildings of many important German mills, but the machinery was relatively undamaged. He reported that possibly the only bottleneck, which might stop the Germans from reaching their full quota of steel production, is the hitch in the importation of Swedish and French ores. The French aren't very agreeable to shipping their ores into occupied areas. The Swedish ore shipments might be held up because of currency trouble.

German rail lines and general transportation equipment are practically back to normal Mr. Sykes said. He was asked about the status of the Goering bessemer plant built just prior to hostilities. Mr. Sykes did not see this plant personally, but he stated that the facilities are slated to be junked and the Germans aren't shedding any tears over losing this plant. Mr. Sykes said production at the big basic bessemer plant, German industrialists reported to him, had not proved feasible; it was built at the government's insistence; German steel makers had decided against the whole process before the program was started.

A permanent committee is to be formed to oversee German steel production. The industry itself will be run by a trust of German operators who will take orders from this joint American, British, French commission, the Inland president reported. He said that he was not slated to serve as a member of the commission.

Tool Engineers Meet

Detroit

• • • **L. E. Osborne,** senior executive vice-president of Westinghouse Electric Corp., is scheduled to be the guest speaker at the national banquet of the American Society of Tool Engineers at the William Penn Hotel on March 12, according to I. F. Holland, president of the society.

The ASTE's 3-day annual meeting which begins on March 10, will emphasize technical discussions, feature talks on industrial methods, machines and operations by leaders in various fields and include tours of many plants in the Pittsburgh area.

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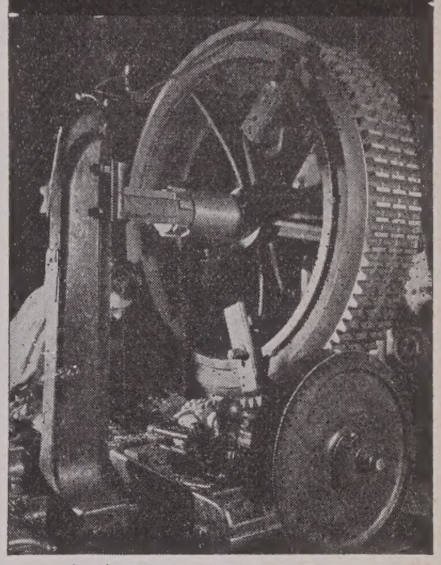

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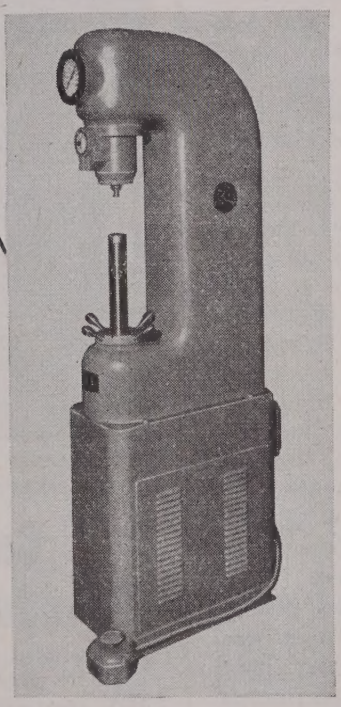

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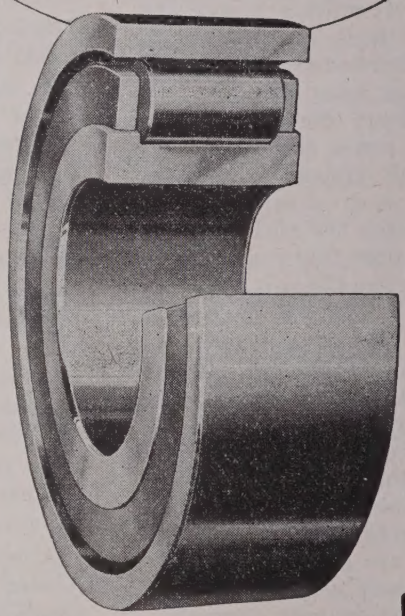

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